ADDITIONS TO THE TURBELLARIA, NEMERTINA, AND ANNELIDA OF THE BERMUDAS.

[PLATE LXX.]

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XVIII.—Additions to the Turbellaria, Nemertina, and Annelida of the Bermudas, with Revisions of some New England Genera and Species. By A. E. Verrill.

Very little has hitherto been published concerning the Turbellaria and Nemertina of the Bermudian fauna.* Both these groups seem to be sparingly represented there, though some of the species are of special interest.

Particular efforts were made by our party to make good collections of these groups and of the Annelida. Yet of the two former groups we found only three planarians and four or five nemerteans. The nemerteans were all of rather small size and inconspicuous coloration, contrary to what is usually the case in the warmer seas.

TURBELLARIA; DENDROCŒLA.

Leptoplana lactoalba, sp. nov.

Body, when extended in life, long-lanceolate or narrow-oblong, very flat, with thin undulated edges. Ocelli rather numerous,

Figure 9.—*Leptoplana lactoalba*. ×1½.

arranged in two parallel series, each series having a rounded cluster near the posterior end and about two separated larger ocelli in line behind each cluster.

Color, translucent milk-white.

Length, in life, 30–50^{mm}; width, 10–12^{mm}.

Under stones and corals on the reefs, 1898.

Similar to *Leptoplana pallida* of the Gulf of Naples.

* A small terrestrial nemertean (*Tetrastemma agricola* W. Suhm) was discovered at Bermuda, by the naturalists of the Challenger. It occurs in brackish moist localities under stones, etc. (See Mosley, Notes by a Naturalist, p. 26.)

Pseudoceros superbus Lang.

Lang, Die Polycladen, Fauna und Flora des Golfes von Neapel, p. 540, pl. v, fig. 5; pl. xxi, figs. 2, 14; pl. xxii, figs. 1, 2, 3, 6, pl. xxx, fig. 18.

Plate LXX. Figure 5.

Three specimens of this large and handsome species were obtained. We found it difficult to preserve well by any of the ordinary methods, either in alcohol or formalin. It is soft, thin, and very mutable in form.

Its color, in life, is a very rich, dark, purplish black or very dark maroon, with a velvety appearance, bordered all around with a narrow marginal band of bright orange, edged with light orange, while the extreme edge is purplish brown; under side brownish purple.

Length, in life, 50 to 60^{mm}; breadth, 25 to 30^{mm}.

Under stones at and just below low-tide, usually associated with a dark botrylloid compound ascidian or with a dark purplish sponge, with both of which it corresponds closely in color.

This is one of the few species of Bermudian marine invertebrates which appear to be certainly identical with Mediterranean species, though many are closely related. Among the nemerteans there is another case of this same kind (*Tæniosoma curtum* Hubr.).

Pseudoceros pardalis, sp. nov.

Plate LXX. Figures 6, 6*a*.

A large, broad species, covered with yellow spots.

Body, as preserved, broadly elliptical or oblong-ovate, subtruncate anteriorly, with thin undulated margins. Ocelli numerous.

Color, in alcohol, brownish black, covered with numerous round, pale yellow spots (probably bright yellow in life). Length, 60^{mm}; breadth, 40^{mm}.

The only specimen of this fine species was collected many years ago by Dr. C. Hartt Merriam and presented by him to the Museum of Yale University.

NEMERTINA.

The most interesting nemertean, as well as the most common, appears to be identical with a Mediterranean species of wide distribution. Mr. W. R. Coe, who has studied the Naples nemerteans in the Biological Station, made sections of my Bermudian specimens for comparison. He has given me the following synonymy and memoranda concerning this species:—

Tæniosoma curtum (Hubrecht) Coe.

Polia curta Hubrecht, Genera of European Nemerteans critically revised, Notes Leyden Museum, 1879.

Eupolia marmorata Bürger, Unters. ueber Anat. u. Histol. der Nemertinen, Zeitschr. wiss. Zoöl., vol. l, 1890.

Eupolia curta Joubin, Les Némertiens, Faune Française, Paris, 1894. Bürger, Nemertinen, Fauna und Flora des Golfes von Neapel, Monogr. 22, 1895.

Plate LXX. Figure 3.

"The specimens obtained in Bermuda belong to the more slender variety of the species, and show numerous sharply-marked, but interrupted, longitudinal lines. Both in their external appearance and internal organization these specimens exhibit a close resemblance to *Tæniosoma delineatum* (= *Polia delineata* Delle Chiaje,* = *Eupolia delineata* Hubrecht†), and in many respects are intermediate between the two species. The Bermudian form agrees in detail with the specimen collected at Mauritius and drawn by Möebius.‡ The species has a wide range of distribution. It is common in the Mediterranean, and has been recorded, also, from Mauritius, Chili, Samoa, Fiji Islands, and other localities in the tropical and subtropical seas of both hemispheres.

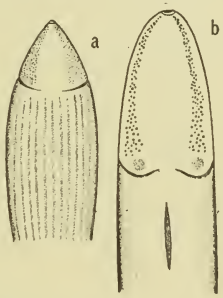

Figure 10.–*Tæniosoma curtum; a*, dorsal; *b*, ventral views of the head. ×4.

T. delineatum has an even greater range of distribution than has *T. curtum*, and is commonly found associated with it. From my experience with Naples forms I am somewhat doubtful whether this is specifically distinct from *Tæniosoma curtum*."§

When fully extended in life our larger specimens were 250 to 300^{mm} long; they were quite slender and flattened, about 2 to 3^{mm} broad, but changeable; the head is usually a little broader than the body, and subacute. In contraction the body is nearly round. General tint, to the naked eye, is light smoky brown, yellowish brown, or chocolate-brown, due to numerous narrow alternating

* Memorie sulla storia e notomia degli animali senza vertebre del regno di Napoli, Naples, 1823–28.

† Voyage of the Challenger, Nemertea, Zoöl., vol. xix, 1887.

‡ Bürger, Beitr. zur Anat., etc., der Nemertinen, Zeits. wiss. Zoöl., lxi, 1895.

§ The generic name *Tæniosoma* Stimpson, 1854, Proc. Philad. Acad. Sci., ix, has evident priority over all other names proposed for this genus.

stripes of dark chocolate-brown and grayish or yellowish white. About 100 minute ocelli in each lateral group.

Common in shell-sand at low-tide and also in cavities in dead corals.

Lineus albocinctus, sp. nov.

Plate LXX. Figures 1, 1*a*, 1*b*.

Body not very long, slender, tapered posteriorly, a little flattened; head usually a little wider than body and more depressed. Ocelli small, about 4 or 5 in a single series on each side of the head. Lateral fossæ large and long.

Color dark smoky-brown or nearly black, crossed by about 20 white rings, which become like narrow white lines in contraction; neck usually with a wider white band ; head with white edges and a median white dorsal spot. Under side whitish.

Length, in extension, 35 to 50^{mm}; diameter, about 1 to 1.5^{mm}.

Low-tide, among corallines.

Lineus albonasus, sp. nov.

Plate LXX. Figure 2.

Body small, very slender, tapering posteriorly; head not enlarged. Ocelli usually two on each side, in the white patch.

Color red, usually brownish red anteriorly, and becomes light cherry-red posteriorly ; front of head clear white above.

Length, in extension, about 35^{mm} ; diameter 1^{mm} or less.

Bailey Bay, at low-tide.

Another nemertean, 100 to 150^{mm} long and about 3^{mm} in diameter, in extension, was found at low-tide in tenacious tubes coated with shell-sand. It is light orange-yellow anteriorly, becoming pale ochre-yellow posteriorly. Proboscis long and slender. It is probably a *Lineus*, but has not been carefully studied.

ANNELIDA.

The annelids are numerous at Bermuda, but our collection has not yet been fully studied. It includes over 110 species. A list of Bermudian annelids was published by Prof. H. E. Webster* in

* The Annelida from Bermuda collected by Mr. G. Brown Goode, Bulletin U. S. Nat. Mus., No. 25, p. 307, pl. vii–xii, 1884.

1884, based on the collection made by Mr. G. Brown Goode in 1872. This list included 26 species, of which 13 were described as new.

Five species, viz : *Podarke obscura* Ver.; *Arabella opalina* Ver., *Arenicola cristata* Stimp. ; *Enoplobranchus sanguineus* Ver. ; *Hydroides dianthus* Ver. are found, also, on the southern New England coast, but probably range southward to the West Indies. The balance are known West Indian species.

M'Intosh, in Report Voy. Challenger, Annelida, vol. xii, 1885, records 13 littoral species of Bermuda annelids, some of which are identical with those of Webster's list.

One of the larger and more conspicuous forms is *Protulides elegans* W., which projects from its tough tubes large and elegantly formed branchial plumes, as brilliant and varied in colors as carnations. It is common on the reefs, its tubes being contained in dead corals. It is also found on the coast of North Carolina.

Another large species is *Terebella magnifica* W., which lives buried in shell-sand at low-tide. In life its large flaccid body, which is pale flesh-color or nearly white, is often 12 to 16 inches long and about half an inch in diameter, while its numerous white tentacular cirri can be extended more than a foot in every direction. This belongs to *Polymnia* Malmg. or *Eupolymnia* Ver.

The *Hermodice carunculata* Kinb. is a large, stout species, densely covered with sharp, white calcareous setæ, with red gills between them. It is very common under stones at low-tide.

Cirratulus grandis Verrill, a large yellowish green or olive-green worm, with numerous long orange-red cirri, is common at low-tide in sand, especially in stony places. It agrees perfectly with New England specimens. It is not in Webster's list.

In our collection there are three species of Phyllodocidæ and more than twenty-five of Syllidæ, including ten species of *Syllis*. These families are not included in Webster's list.

Polynoë pustulata M'Int. = *Polynoë granulata* Ehlers = *Halosydna leucohyba* Web., *non* Schmarda, a large scaly species, was common, living as a commensal in the tubes of a large *Eunice*, in dead corals.

Miss K. J. Bush has identified the following species in our collection that are new to the fauna :

Nereis articulata Ehl.
Nereis Antillensis M'Int.
Trypanosyllis vittigera Ehl.
Eunice violaceomaculata Ehl.
Marphysa Goodsiri ? M'Int.
Lumbrinereis Floridana Ehl.
Branchiomma lobiferum Ehl.
Eupomatus uncinatus (Phil.) Ehl.

Additional unrecorded species occurred in the following genera:—

Nereis.
Leodice or *Eunice*, 7 sp.
Marphysa, 2 sp.
Arabella.
Cirratulus.
Aricia.
Anthostoma or *Scoloplos.*
Sabella.

The following genera, hitherto unrecorded from the Bermudas, are represented in our collection by undetermined or new species:—

Chrysopetalum.
Sthenelais.
Eulalia.
Phyllodoce.
Eteone.
Autolytus, 2 sp.
Syllis, 10 sp.
Haplosyllis, 2 sp.
Eusyllis, 2 sp.
Desmosyllis, g. nov.
Trypanosyllis, 3 sp.
Hemisyllis, g. nov.
Opisthosyllis.
Odontosyllis, 2 sp.
Branchiosyllis.
Grubeosyllis, n. nov. 2 sp.
Lysidice.
Paramarphysa.
Heteromarphysa, g. nov.
Nematonereis.
Lumbrinereis, 2 sp.
Staurocephalus or *Staurinereis*, n. nov. 2 sp.
Cirrhinereis or *Cirronereis.*
Heterocirrus.
Capitella
Notomastus.
Clymene or *Euclymene*, n. nov.
Axiothea or *Axiothella*, n. nov.
Polydora.
Pectinaria.
Loimia.
Eugrymœa, g. nov.
Protothelepus, g. nov.
Nicolea.
Polymniella, g. nov.
Polycirrus, 3 sp.
Frotula, 2 sp.
Vermilia, 2 sp.
Filigrana.
Spirorbis, 2 sp.

The following are some of the new species* obtained, especially of the Syllidæ and Eunicidæ.

Phyllodoce Bermudæ, sp. nov.

A small, slender species, with cordate-lanceolate posterior branchiæ and large caudal cirri.

Head small, rounded, both in front and behind. The front a little more produced. Antennæ about equal, lower a little shorter; upper ones as long as head, fusiform with acuminate tips; tentacular cirri similar in form, but longer. Eyes large, round, black, posteriorly placed. Inferior branchial lobes, on the anterior segments, oblong-ovate, $1\frac{1}{2}$ times as long as broad, with round blunt tips; farther back they gradually increase in size and length, those about the middle

* The illustrations of these species could not be finished in time for publication in this article. They will be published in vol. xi of these Transactions in connection with the full report on the Annelida.

being twice as long as broad. Upper branchiæ are preserved only on the posterior third of the body ; the most anterior seen are cordate-lanceolate, one-third longer than broad, with blunt tips; farther back they become narrower lanceolate. Caudal cirri large, dark colored, oblong-ovate, obtuse, 4 times as long as broad. Setæ are long and very slender, the blades rather long, straight, very acute.

The color in formalin is reddish brown (in life probably green) ; the branchial appendages and caudal cirri are more deeply pigmented than other parts, and nearly opaque; a transverse fusiform lighter spot exists between the segments, bounded by narrow, curved, whitish lines ; there is a dark spot at the dorsal base of the parapodia, surrounded by a pale zone.

Length, as preserved, about 14^{mm} ; diameter 1^{mm}, in life much longer.

Eulalia megalops, sp. nov.

A long and slender, dark green species with very large eyes.

Body wider in the middle, tapering gradually to both ends. Head ovate, obtuse in front, longer than broad. Eyes very large, black ; four frontal antennæ long, slender, whitish ; odd tentacle similar in size ; 4 pairs of long, slender, tapered tentacular cirri, the dorsal pairs longer, in life six times as long as head. Branchial lobes of parapodia falcate, long, narrow, acute, curved upward, $1\frac{1}{2}$ to 2 times as long as breadth of body.

Color, in life, mostly dark olive-green ; branchiæ light green ; anterior segments with a whitish transverse marginal line and a pale median patch. Length, in life, 90^{mm} ; breadth, 1.5^{mm}.

Bailey Bay, in dead corals.

Syllis Savigny. (Including *Typosyllis* and *Ehlersia*.*)

The genus *Syllis* is here taken to include those species having minutely bidentate tips to the terminal blades of the compound setæ, as well as those in which the tips are acute. In some species both forms occur on the same individual and in many cases the bidentation is so slight as to be visible only under a high power objective (e. g. No. 6, Zeiss or Leitz, or $\frac{1}{5}$ inch American), so that it seems useless to make this a generic character. *Eusyllis* Malmgren was separated mainly on this account from *Syllis*, but the type species, *E. Blomstrandi* M., also has the dorsal cirri nearly smooth or with-

* For a synoptical table of the genera and subgenera of Syllidæ here described see p. 632.

out evident articulation or beading, while in true *Syllis* they are very distinctly beaded or articulated. This was made the principal character of *Eusyllis* by McIntosh. Langerhans restricted it to species having the edge of the œsophagus denticulated, and in that sense it is used by me. All the Bermuda Syllidæ studied by me, except *Odontosyllis*, *Autolytus*, and *Grubeosyllis*, have distinctly and usually strongly articulated cirri.

In most of the following species the blades are decidedly longer on the upper than on the lower setæ, and they are decidedly shorter on the posterior segments than on the anterior, so that no very close descriptions nor measurements can be briefly given that would be useful. Nor are the differences so marked as to be very useful for the recognition of related species, even when figured, owing to the variations of each. The forms of the palpi, antennæ, cirri, œsophagus, and stomach afford better characters, though these are all able to vary considerably by contraction.

In our species of *Syllis* the œsophagus (or chitinous pharynx) has a solitary, conical, median tooth, and usually a smooth anterior margin, becoming revolute when extruded from the mouth, but in a few the margin is minutely crenulate, or it may be ill defined, passing gradually into the soft part.

More than one species of *Syllis* was observed, in life, in the process of producing one or more free sexual zoöids by the alteration and breaking away of a certain number of posterior segments, as in *Autolytus*, and some were preserved with the fully formed zoöids attached. These agree with the genus *Tetraglene*. They have large eyes, with a lens, but lack antennæ and palpi. They have fascicles of long capillary setæ, in addition to the compound setæ, and long beaded cirri. Several specimens of *Tetraglene* were also taken in the surface towing-net, in the evening, about the last of May, associated with the allied form of sexual zoöids known as *Chætosyllis*.

But in related species of *Syllis* (*S. corallicola*, *S. catenula*, *T. fertilis*) masses of ripe eggs were found along the posterior half of the body, without any alteration of the segments, setæ, or cirri. The species of *Syllis* seem, therefore, to differ widely in their life histories.

Many of the following species of Syllidæ were obtained by breaking up dead and decayed masses of corals, and placing them in dishes of water for the annelids to crawl out. Others were obtained by placing masses of living corallines and sponges in the dishes, especially at night, for the same purpose.

Syllis (Typosyllis) corallicola, sp. nov.

A large species with long, strongly beaded antennæ and cirri, and with a large, rather short, dark brown, chitinous œsophagus armed with a single tooth near the emarginate edge.

Head large, about one-third broader than long (1: 1.33 to 1: 1.50 in contraction), frontal margin broadly rounded and slightly three-lobed, the median lobe only slightly prominent, sides strongly convex, narrowing backward, posterior margin with a wide shallow emargination. Eyes conspicuous, with lens, but not very large, the anterior distinctly larger and farther apart, those of the same side pretty near together. Palpi large and broad, separate to base ; when extended the free part is as long as the head or longer, ovate-lanceolate, slightly incurved on inside, obtuse at the end. Odd antenna or tentacle long and tapered, about 5 times as long as the head, its free portion $3\frac{1}{2}$ times as long as that of the palpi, strongly beaded, the annuli about 40, short and not very separate proximally, but becoming longer and very distinctly constricted distally. Antennæ about $\frac{1}{3}$ shorter than the tentacle, and more slender, beading similar, the annuli broader than long. Dorsal tentacular cirri much like the tentacle, but $\frac{1}{3}$ longer ; ventral one smaller and nearly $\frac{1}{2}$ shorter. Anterior dorsal cirri are also mostly long like the tentacular cirri, but farther back part of them, alternating irregularly, become shorter; the longer ones are 2 to 3 times as long as the tentacle and equal to twice the diameter of the body, while the shorter ones are equal to about $\frac{2}{3}$ its diameter.

The setæ are slender and long, the upper ones with rather long, narrow, nearly straight, lanceolate blades, 6 or 8 times as long as wide, with minutely bidentate tips; the lower and posterior ones have wider, bidentate blades, often only 2 or 3 times as long as broad. Anteriorly 3 or 4 spiniform acicula occur in each fascicle; 1 or 2 posteriorly.

The œsophagus (or chitinous proboscis) is stout, moderately long, occupying 10–12 segments, often wrinkled or crumpled in contracted specimens, dark brown, its anterior edge not denticulated, but with a ventral emargination ; the median tooth is rather large and a little back from the edge. The stomach is long, occupying 14–17 segments, in preserved specimens about $\frac{1}{3}$ longer than the œsophagus and decidedly stouter, a little wider in the middle, covered with dense rows of dark rounded granules or glands.

Color, in formalin, yellowish white ; the annuli of the cirri have groups of pale greenish pigment cells.

Length up to 1.5 inches or more (or 40^{mm};) diameter, 2–3^{mm}.

Var. **lineolata**, nov.

This variety occurs with the preceding form, from which it differs chiefly in color. The cirri and antennæ are equally long, and the setæ have the same forms. In formalin each anterior segment is crossed close to the anterior edge by a narrow brown line ; another similar transverse brown line runs across the middle of the segments, but does not reach the sides; behind the middle of the body these lines gradually fade out. In some specimens they are rather faint even anteriorly. The color in life was not noted. Both varieties were common in the cavities of dead corals, from the reefs; also in corallines.

Syllis grandigularis, sp. nov.

This closely agrees in size and appearance and in its setæ, with *S. corallicola*. It differs in having a larger and broader head, widest in front of the eyes, which are black and in a trapeze, and especially in the very large size of the œsophagus and stomach, and their structure. The œsophagus is nearly as long and almost as thick as the stomach, and nearly fills the anterior part of the body ; its margin is nearly even and entire, but appears to be minutely crenulated when extruded, and the median tooth is very large, blunt-conical, and projects one-third of its length beyond the margin of the extruded proboscis. The stomach is elongated, tapering a little toward both ends; it occupies 8 segments ; its surface is covered with numerous close, confused and irregular rows of cells,* but they do not form regular, rounded groups, as in most other species.

The antennæ and cirri are all long and slender,—more slender than in *S. corallicola* and *S. catenula*,—and composed of numerous round strongly pigmented beads, about as long as broad. The posterior setæ are longer than the anterior with strongly incurved acute blades on the lower ones. Allied to *S. annularis*, also.

Length, in formalin, 18^{mm}.

Syllis (Typosyllis) catenula, sp. nov.

A smaller and more slender species than the preceding with rather shorter cirri, long palpi, and a rather longer and more cylindrical œsophagus, armed with a small tooth close to the entire and even margin, usually with linked markings on back, often causing three rows of pale spots. Head about one-half wider than long (ratio

*According to some observers these are radial muscular cells, not glandular.

1: 1.45), the front edge usually slightly and broadly three-lobed, sometimes rounded; sides evenly rounded; posterior strongly emarginate. Eyes rather small, the pairs far apart, those of each side close together, the anterior larger and more lateral, with lens. Palpi large and long, divergent, lanceolate, somewhat falcate, with a broad base, blunt end and incurved inner margin; the free part usually projects $\frac{1}{4}$ more than the length of the head. Tentacle tapered, moderately long, nearly three times as long as head, about $\frac{1}{3}$ of its length projects beyond the palpi, strongly and elegantly beaded, with 20–22 annuli, these are 2 to $2\frac{1}{2}$ times as broad as long distally, each with pigmented cells. Antennæ similar, with the same beading, $\frac{1}{4}$ to $\frac{1}{3}$ shorter and smaller, projecting only a little beyond the extended palpi. Dorsal tentacular cirri similar to tentacle but about $\frac{1}{8}$ longer, with 28–30 annuli; lower ones about $\frac{1}{2}$ as long. First dorsal cirri still longer, about $1\frac{1}{2}$ times as long as the tentacle, with 30 or more annuli. Several others on the anterior segments are nearly as long, but alternate irregularly with much shorter ones, $\frac{1}{2}$ to $\frac{2}{3}$ as long, all becoming rather shorter posteriorly; the longer ones are about twice as long as the diameter of the body. Caudal cirri long and slender, beaded like the dorsal cirri and equally long, but more slender. Setæ slender, the upper ones with nearly straight, narrow lanceolate blades, 4 or 5 times as long as wide, with slightly bidentate incurved tips, sometimes entire; the ventral and most posterior setæ have the blades much shorter. Acicula usually 2–4, spiniform.

Œsophagus rather long and slender, occupying 10–12 segments, in extension $1\frac{1}{4}$ times the length of the stomach, but it is sometimes made shorter and wrinkled in contracted specimens, so that it may be scarcely longer than the stomach. When protruded from the mouth the aperture is flaring with the margin even, entire, and often revolute; the tooth is small, acute, near the edge and sometimes projects beyond it when everted. The soft membranous proboscis when everted shows about 10 rather broad obtuse denticles or lobes, the 6 dorsal ones larger. Stomach long, cylindrical, usually occupying 6 to 8 segments, usually shorter than the œsophagus and distinctly larger, covered with close rows of rounded glandules. Color, in formalin, yellowish white, each segment anteriorly marked dorsally with two curved transverse lines of brown, which converge and blend into a spot on the middle of each segment, and also unite at the sides, so as to enclose, on each side, an elliptical pale spot, and leave a similar spot between the segments along the middle of the back; thus there are three alternating rows of pale spots along the back, but these

fade out posteriorly and are often indistinct anteriorly. Color, in life, was not noted. One ♀ was found filled with eggs.

Length of preserved specimens usually 20–25^{mm}; diameter, .75 to 1^{mm}.

Common among corallines and in dead corals.

Syllis jugularis, sp. nov.

This species is closely related to *S. catenula*, with which it agrees very nearly in its cirri and setæ. It is somewhat smaller and more slender. The most obvious difference is found in the œsophagus, which is much longer and more slender than that of the latter. It is straight and rather narrow, nearly cylindrical, with a basal swelling and an even, entire, expanded or flaring margin. Its tooth is very small, conic, close to the edge, or projecting a little beyond it. When extruded its base is at the 14th segment and its margin projects much beyond the head. The stomach is much shorter (about one-half as long), and occupies about 7 segments. It is cylindrical and has numerous regular rows of rounded groups of cells.

Length, 12^{mm}.

Syllis (Typosyllis) diplomorpha, sp. nov.

A large elongated species which produces *Tetraglene*-zoöids by posterior fission. Proboscis pale colored, short, stout, shorter than stomach.

Head large, nearly as long as wide, narrowed behind middle, three-lobed anteriorly, broadly and strongly emarginate posteriorly (ratio in type 1:1.15). Eyes black, large, the anterior at least twice as large as the others and considerably farther apart, but only a little more in advance, the distance between the two about equal to the diameter of the anterior eyes; posterior eyes just behind bases of antennæ. Palpi divergent, large and broad, about as long as the head, lanceolate, obtuse, incurved on the inside. Tentacle long, 3½ times as long as the head, regularly beaded. Antennæ similar, but shorter, about 2½ times the length of the head; upper tentacular cirri about equal to the tentacle; lower equal to the antennæ. First and fourth dorsal cirri long, about ⅓ longer than the upper tentacular cirri; 3d and 4th are somewhat shorter, about equal to the tentacle; farther back the dorsal cirri are shorter, more slender and tapered, and unequal, the longer ones in the middle of the body are about equal to ⅔ the diameter of the corresponding segments; the shorter ones about half as long.

Setæ are long and abundant; the upper anterior ones have narrow lanceolate blades, 3 to 4 times as long as broad, with slightly bidentate tips; the lower ones are only about 2 times as long as broad, with incurved tips.

The œsophagus is stout and rather short, occupying 7 segments, cylindrical, about $\frac{1}{3}$ shorter than stomach and nearly as thick; it is unusually translucent, lacks the brown chitinous color seen in most species; its tooth is near the margin, which is not well defined, but seems to be entire. The stomach is long and thick, cylindrical, and occupies 9 segments; it is crossed by numerous crowded rows of rounded granules.

Color of type, in formalin, pale greenish brown, each anterior segment crossed by a pale narrow sutural line and sometimes by a darker brown middle line; posterior half of the body has a row of squarish spots along each side at the bases of the parapodia. Length, 30^{mm}; diameter, 1.5^{mm}.

The posterior end, in the type, is changed into a *Tetraglene*-zoöid, back of the 110th setigerous segment. The new head has four very large and prominent black eyes with lens, but lacks all other appendages, the eyes are in contact on each side. There is no buccal segment, the first segment is very short and has setæ. All the 20 segments bear fascicles of long, slender capillary setæ, longer than the breadth of the body, and a smaller number of compound setæ. The dorsal cirri have been lost.

The parapodia are large and prominent, as long as half the breadth of the segments.

Syllis (Tetraglene), sp.

In a small collection of plankton, taken in the latter part of May, there are several specimens of a *Tetraglene* somewhat similar to the above, but evidently a distinct species.

The head is much shorter and smaller, with very much smaller, separated, light brown eyes. The body itself is larger and much stouter, with 24 crowded, broad segments and short, rounded parapodia. The dorsal cirri equal about $\frac{1}{4}$ the breadth of the segments, and are regularly beaded and tapered. The caudal cirri are not tapered, as long as the dorsal cirri, and strongly beaded with about 10 annuli, the distal beads are nearly round. Large fascicles of slender compound setæ are present on all the segments, with short terminal blades, $1\frac{1}{2}$ to 2 times as long as broad, part of them very minutely bidentate at tip. No capillary setæ are present on either specimen. A row of rather dark, round spots runs along each side, a spot being at the base of each parapodium.

Syllis (Chætosyllis), sp.

Several specimens of sexual zoöids with two antennæ, but otherwise like *Tetraglene*, were taken at the surface. They probably belong to some species of *Syllis*.

Syllis (Typosyllis) annularis, sp. nov.

A small species with long slender antennæ and dorsal cirri, banded with dark green, and with long fascicles of setæ, the posterior ones longer and stouter with short, strongly incurved, acute blades; œsophagus short, wide, brown, with a long acute tooth.

Head large, broader than long, widest at the front, opposite anterior eyes, narrowed backward; front margin broadly rounded; posterior margin broadly emarginate. Eyes not very large, pale brown, the anterior a little larger and separated from the posterior by a space equal to their diameter; a minute brown pigment speck at the base of each palpus may represent the third pair of eyes. Palpi large with broad swollen bases, rather longer than the head, abruptly narrowed on inside, at about the proximal third, blunt at tip.

Tentacle stout, a little tapered, about $\frac{1}{3}$ longer than the palpi, strongly annulated, with about 20 annuli; the distal ones longer than broad. Antennæ similar, a little shorter, the ends reaching to within two or three distal annuli of the tentacle tip. Upper tentacular cirri rather longer than tentacle, but of the same thickness; lower one somewhat shorter. First dorsal cirrus larger and about $\frac{1}{3}$ longer than tentacle, of about 38 annuli, the distal half a little stouter than the proximal; most of the cirri on the first eight segments are similar to those of the first, or even longer, or about $\frac{1}{3}$ longer than the breadth of the body; some still longer and more slender occur even back of the middle, conposed of 48 to 52 annuli, with others about $\frac{2}{3}$ as long, of 38 annuli, but the shorter ones usually exceed the breadth of the body.

Setæ of anterior segments are in large fascicles of 5 to 10, all compound, but with about 3 stouter acicula that project but little or not at all; the upper setæ have narrow lanceolate, slightly curved blades, 6 to 7 times as long as wide, with minutely bidentate tips; the lower ones have wider and shorter blades, length to breadth about 3 or 4:1, with strongly incurved, acute, claw-like tips; posteriorly most of the setæ are longer with stouter stems, but the lower ones are shorter; there are about 6–8 in a fascicle, with two or three stouter spiniform acicula, projecting but little; the upper setæ

have stout curved blades, about 3 or 4 times as long as broad, with strongly incurved acute tips; the lower ones have shorter, much curved, acute, claw-like blades, 2 or 3 times as long as broad.

The œsophagus is brown, large, stout, nearly cylindrical, a little contracted at each end, about $\frac{1}{3}$ shorter than the stomach and $\frac{2}{3}$ as broad, occupying 9 segments; anterior margin is entire or feebly crenulate, a little emarginate dorsally; the median tooth is large, long, acute, with a wide ovate base. The stomach is large, longer than the œsophagus, occupying 8 segments, cylindrical, a little swollen posteriorly, covered with numerous interrupted, irregular, or poorly defined rows of minute cells, not arranged in very definite groups.

A caudal region of about 14 new and small segments is being regenerated on the type.

Length of one specimen (32 segments, caudal segments lacking), 7.5^{mm}; breadth, .75^{mm}; length of œsophagus, 1.38^{mm}; of stomach, 1.6^{mm}. Another specimen (type described) with 57 segments and partly regenerated caudal region is 14.5^{mm} long; 1^{mm} broad; length of œsophagus, 1.40^{mm}; of stomach, 1.60^{mm}.

Color, in formalin, is translucent whitish; the cirri appear distinctly banded with 8 to 10 small dark green spots, every fourth annulus having a very distinct, darkly pigmented area.

Rare—only two specimens were found.

Syllis (Typosyllis) cincinnata, sp. nov.

A strongly colored, rather large species, with numerous compact segments and a highly contractile body; when preserved in formalin usually coiled irregularly, thick and rounded anteriorly, with very short, closely contracted segments, short anterior parapodia; flattened and tapered posteriorly, with longer posterior segments and more prominent parapodia and setæ; antennæ and anterior cirri long, strongly beaded and irregularly curled about the head, so as to nearly conceal it; middle dorsal cirri mostly long, incurved over the back; œsophagus short with a very long tooth; stomach very long and large; blades of setæ mostly rather short, strongly incurved, the anterior ones mostly not bidentate at tip.

The head is small, wider than long, transversely broad-elliptical; buccal segment short. Eyes black, unequal, the anterior rather large and near the sides of the head; posterior ones about $\frac{1}{2}$ as large, separated by about their own diameter, and but little farther back, lens indistinct.

Palpi large, separate to base, longer than head, lanceolate when seen from above, with the inner edge incurved, tips blunt.

Tentacle long and large, the free part projecting twice as far as the palpi, composed of very numerous short annuli, 4 or 5 times broader than long. Antennæ similar, about $\frac{1}{3}$ shorter. Upper tentacular cirri similar, rather stouter and about as long; lower about $\frac{1}{3}$ shorter. Dorsal cirri of about 12 anterior segments are mostly even longer than the upper tentacular cirri, much curled in various directions over the head and back, equal in length to $1\frac{1}{4}$ to $1\frac{1}{2}$ or more times the breadth of the body; farther back in the gastric region they become unequal, some being about as long as the preceding, others only $\frac{1}{3}$ to $\frac{3}{4}$ the breadth of the body, usually recurved over the back; posteriorly most of them are less in length than $\frac{1}{2}$ the breadth of that part of the body. Caudal cirri long, slender, tapered. The anterior parapodia are short and crowded, posteriorly they become well separated and longer, with longer lobes and longer and stouter setæ.

Setæ of the anterior segments are 8 to 10 short and slender, accompanied by 3 or 4 acute acicula, which project but little; the blades of the upper anterior setæ are narrow-lanceolate, breadth to length about 1 : 4–6, with incurved acute tips, sometimes faintly bidentate; the lower ones have shorter blades, ratio 1 : 2 or 3, with more incurved acute tips; the posterior setæ have rather longer and stouter stems, with the blades shorter, wider, ratio 1: 2 to $3\frac{1}{2}$, and with more incurved tips, a few of which are minutely bidentate; there are usually 5 or 6 in a fascicle; the stem is serrulate near the tip; they are usually accompanied by two large, straight, acute acicula.

Œsophagus brown, rather short, thick, in the contracted specimens so bent and crumpled that the length cannot be correctly determined; median tooth large, projecting beyond the margin, the free part equal to the length of two segments, long-conic, acute. Stomach long and rather large, nearly cylindrical, occupying 17 segments, covered by about 36 regular rows of well-separated, small, elliptical groups of cells, with definite lines between the rows.

Color, in formalin, is dull greenish with transverse lines of a darker green on each segment and a dark median dorsal stripe along the back.

Length of largest preserved specimen, 18^{mm}; diameter anteriorly, 1.20 to 1.40^{mm}.

Found among the zoöids of *Palythoa mammillosa* at low tide.

In life the head and anterior part of the body were noted as tinged with orange-red, the head brightest red; eyes orange; posterior

segments dark olive-green ; caudal segments and cirri pink. Some specimens were forming two sexual zoöids at the same time (these were not found in the preserved collection). Two or more species were confused in this lot.

Another specimen (No. 12), supposed at the time to be the same, was described when living, as translucent whitish anteriorly, light green posteriorly; the sexual zoöid was pink and had conspicuous eyes and numerous segments, which were broader than those of the stem-form. This is probably a distinct species, for the œsophagus appears to have a crenulate margin and the median tooth is much smaller.

Syllis (Typosyllis) cincinnata. (Stem-form, with a sexual Zoöid.)

One specimen, in formalin, has part of the dorsal cirri replaced by a thick, ovate pigmented body, with a small terminal papilla, perhaps due to disease. This specimen has a zoöid-head forming at about the 28th segment, with two small brown eyes developed, but special antennæ and cirri are not present, nor any capillary setæ. About 50 segments follow this head. In other respects this individual agrees closely with the type-form described above.

Syllis (Ehlersia) exigua, n. sp.

In addition to the various species described above, a small and very slender or attenuated species was noted, but not fully described. The single specimen is poorly preserved. It is remarkable for the unusually elongated segments. Its generic characters are somewhat doubtful.

The body is composed of about 50 setigerous segments. Head rather broad; palpi short ovate; eyes 6, the four posterior, which are nearly equal, form a trapeze ; the anterior are smaller and nearer together. The antennæ, tentacular cirri, and anterior dorsal cirri are all similar, long and slender with numerous rounded beads; the dorsal cirri of the middle segments are also long, often twice as long as the diameter of the body ; posteriorly they become shorter.

Stomach is short, elliptical, as broad as long, occupying about 2 segments.

The setæ are long and slender; in the anterior 10 segments the upper ones have very long, thin blades, ratio, 1 : 8–1 : 10, the lower ones have the blades about half as long, all feebly bidentate at tip; farther back the blades of the upper ones become shorter; on the posterior segments decidedly so. In each fascicle, there is usually a

single, slender, acute, simple seta, and one spiniform aciculum, often bent at top.

Length, 10^{mm} ; diameter, 3^{mm}.

Syllis (Ehlersia) nitida, sp. nov.

A small slender species with the dorsal cirri and cephalic appendages slender and beaded with rounded annuli, mostly 10–14, and in length generally $\frac{2}{3}$ to $\frac{9}{10}$ the diameter of the body, referred to the subgenus *Ehlersia* because the upper compound setæ have long linear blades, very unlike the lower ones.

Head transversely elliptical, considerably broader than long, distinctly three-lobed in front ; posterior margin broadly rounded, eyes 6, black ; two posterior pairs, which form a short trapeze, are small, nearly equal ; a pair of minute front eyes at bases of the palpi. The palpi are large, broad-ovate, obtuse, rather longer than the head. Tentacle, with about 11 regular rounded beads, is rather longer than the palpi. Antennæ are similar, but shorter, with about 9 beads. Upper tentacular cirri are a little longer than the tentacle ; lower ones much shorter.

The dorsal cirri are all similar and vary but little in length, the largest ones being those along the middle of the body, where some of them are about as long as the diameter of the body and composed of 12–14 beads; they are slender and tapered, and very regularly beaded with rounded annuli, mostly about as long as broad ; the shorter ones are from $\frac{1}{2}$ to $\frac{2}{3}$ the diameter of the body, and with about 8 beads. The anterior dorsal cirri are about equal to the upper tentacular cirri, and have about 12 beads.

Setæ are all compound anteriorly, slender, rather numerous ; 1 or 2 upper ones, all along the body, have long, slender, linear, nearly straight blades with incurved tips, ratios 1 : 10–15, becoming longer posteriorly ; the lower ones have much shorter lanceolate blades, ratios 1 : 3–4 ; there is no gradation between the two sorts. Back of the middle the setæ become larger and more differentiated ; the blades of the lower ones are bidentate.

Posteriorly there are usually two spiniform acute acicula, one of which projects considerably.

The œsophagus is long and slender, about twice as long as the stomach ; its tooth is small, conic, close to the margin ; the edge is indistinct, but appears to be finely denticulated. The stomach is narrow-cylindric, covered with many very close rows of glands. Color, in formalin, plain yellowish white. Length, 5^{mm} ; diameter, about 4^{mm}. Only one specimen was taken.

Haplosyllis Langerhans.

Zeitsch. Wissenschaft. Zoöl., xxxii, p. 527, 1879.

This group was made a subgenus of *Syllis* by Langerhans, but it seems to differ sufficiently from that genus to justify its generic separation.

The special character, mentioned by Langerhans, is the presence of simple setæ alone, on all the segments. "Setæ all simple." In our species the shortness and paucity of the setæ are equally noteworthy, for there are usually only one or two short setæ, with a single hooked aciculum, in each fascicle. The simple bidentate setæ have the structure and nearly the form of the stem or shaft of the ordinary form of the compound setæ of *Syllis*, indicating that they are merely such setæ that have lost, or else have not developed, the blade. They are unlike the bifid setæ of *Eusyllis viridula*, which seem to be formed by the consolidation of a short angular blade with the shaft.

Our species of *Haplosyllis* also have the edge of the œsophagus denticulated, nearly as in *Eusyllis*. So that the group appears to be allied to the latter more than to *Syllis*.

The typical genus *Syllis*, as restricted by Langerhans, has simple setæ anteriorly or medially and compound setæ posteriorly. *Typosyllis* has them all compound, or with compound ones on all the segments.

Haplosyllis cephalata, sp. nov.

A small and rather stout species, appearing stouter anteriorly, owing to the prominent head and unusually large palpi; eyes small, black; a few longer anterior cirri; those on most of the body very short, composed of few annuli; setæ simple, bidentate, very few; œsophagus rather short, with a median anterior tooth.

Head thick and convex above, elliptical in outline, widest about the middle, with a slight median lobe anteriorly; posterior edge slightly emarginate. Eyes unusually small, round, black, arranged in a trapeze; the posterior pair are rather small and separated from the anterior by a space equal to 3 or 4 times their diameter.

Palpi very large, wider than the head, ovate, not excavate on the inner margin, obtuse at the end; the exposed part longer than the head, scarcely divergent, but often strongly curved downward in the preserved specimens, with their bases overlapping each other. Tentacle and antennæ long and slender, strongly beaded; the tentacle projects considerably beyond the ends of the palpi; the anten-

næ are shorter, only projecting a little beyond the palpi. The upper tentacular cirri are similar to the tentacle and of about the same length. The lower ones are about $\frac{1}{3}$ shorter.

The 1st dorsal cirrus is similar to the upper tentacular cirrus, but longer. The 2d is very much shorter, and the succeeding ones rapidly decrease in length, those beyond the gastric region being only 1/5 to 1/6 as long as the diameter of the body, or even less, and consisting of only a few annuli (often only 3 or 4) and scarcely longer than the parapodia.

Setæ very few ; anteriorly there are usually 1 or 2 rather strong simple bidentate setæ and one acute aciculum, which rarely projects ; posteriorly there is generally only one bidentate setæ, which is longer and larger than the anterior, and a single aciculum, which often has a bent, hook-like tip. No blades were found on any of the setæ of numerous specimens examined. The bidentate setæ, which correspond to the stems of compound setæ, have a simple, incurved or slightly hooked tip, with a strong triangular tooth below it, the intervening space being concave and oblique. Possibly a blade may be present in the very young. The anterior parapodia are short; the posterior ones become more elongated.

The œsophagus is rather short and wide, pigmented with opaque green, so that its form is not easily seen; median tooth near the edge, acute conical, its end projecting beyond the aperture ; margin incurved and usually indistinct, but minutely denticulate, at least in some cases. Soft pharynx with about 10 rounded lobes. Stomach barrel-shaped, usually a little shorter and not much thicker than the œsophagus, opaque, the rows of glands poorly defined ; sometimes the stomach and œsophagus are about equal in length, or the stomach may be the longer, owing to the frequently crumpled and contracted condition of the œsophagus.

Color, in formalin, is yellowish white; the tissues are more opaque than in most species. Length, 4 to 6^{mm} ; diameter, .5 to $.6^{mm}$.

Taken in large numbers on one occasion. It inhabits sponges.

Easily distinguished from the young of other species by the large palpi, head, and anterior segments, and the extreme shortness of all the cirri, except those of the head and first segment. The small number of the setæ and their peculiar tips are also characteristic.

This is allied to *H. hamata* of Europe and Madeira, which has the tips of the simple setæ trifid, and to *H. tentaculata* (Mar. 1879, as *S. spongicola*, var.), which has much longer cirri and trifid setæ.

H. streptocephala (Œrst and Grubé), from St. Croix, has longer cirri.

Haplosyllis palpata, sp. nov.

An elongated, slender, somewhat larger species, with large palpi and longer dorsal cirri and setæ than those of *P. cephalata*. The head and antennæ are nearly as in the latter; the palpi are very large and thick, subovate; the body has more numerous and more distinct segments. The dorsal cirri are unequal, but the longer ones, along most of the body, have about 9 or 10 rounded annuli, about as long as broad, and in length are equal to about $\frac{1}{2}$ the diameter of the body. The setæ consist of two or three simple, strongly bidentate setæ, similar to those of the preceding species, but larger and longer, and of one or two acicula, one of which has a small bent tip. The œsophagus is rather long, tubular; its margin is indistinct, but seems to be entire; the tooth is small. *H. Setubalensis* (McInt.) (as *Syllis*) resembles this species in the character of its setæ.

Trypanosyllis attenuata, sp. nov.

Body very long and slender, composed of a large number of rather elongated segments. Cirri all moderately long and strongly beaded with rounded annuli.

Setæ numerous, all compound with rather long narrow blades.

Head about as long as broad, well rounded and slightly three-lobed in front and nearly truncate posteriorly. Eyes 4, small, black, in trapeze, the anterior ones a little larger and situated much behind the middle of the head, at about the posterior third, separated from the posterior by a distance equal to about four diameters of the latter. Palpi large and broad, wider at base than the head, separate to the base, divergent, thick at the base and incurved on the inner margin, very obtuse at the end.

Antennæ and tentacle are gone; upper tentacular cirrus long and slender, composed of about 17 rounded annuli; first dorsal cirrus considerably longer, with about 24 annuli. Succeeding dorsal cirri are all much shorter and somewhat unequal, the longer ones being about as long as the diameter of the body, and composed of 12–14 rounded annuli, mostly about as long as broad, or a little longer distally; the shorter cirri are about $\frac{3}{4}$ as long. Similar cirri continue to the end of the body, gradually decreasing in size.

The caudal cirri are long and slender, their length being equal to the diameter of the body in its middle, composed of about 13 annuli, which are mostly longer than broad.

The setæ are numerous and slender, about 10–12 compound ones in the anterior fascicles, with three or four small slender acicula that do not project. The blades of the upper setæ are narrow and nearly

straight, ratio about 1 : 6–9, with the tips very minutely bidentate and slightly incurved ; the lower ones are shorter, ratio about 1 : 4–5, but of the same form. Posteriorly they become larger and longer, with stouter stems, usually 5 or 6 in a fascicle, and the blades are somewhat broader and more distinctly bidentate at tip, but the change is very gradual.

The œsophagus is very long and slender, straight, occupying 17 or 18 segments; its edge is divided into a circle of about 10 rounded or obtuse scallops ; median tooth small, close to the edge; soft pharynx, when extended, elongated, its margin with about 10 large rounded lobes, longer than broad, the seven upper ones longer than the lower. The stomach is small, oblong-elliptical, occupying 4 segments ; it is covered by about 26 rows of small cell clusters.

Color, in formalin, yellowish white ; œsophagus and stomach pale.

Length, about 16^{mm} ; diameter, .25 to .30^{mm}.

Dredged off Bailey Bay, in 5–6 fathoms, shell-sand.

Typanosyllis fertilis, sp. nov.

A species of medium size, with a large and broad head and wide palpi; rather long, strongly beaded dorsal cirri; numerous and long setæ, the posterior ones decidedly longer and stouter than the anterior, with a short, wide, distinctly bidentate blade. The female has the posterior half of the body distended with large polygonal eggs, but has no special sexual setæ.

Head unusually large and wide, broader than long, with the sides very prominent and convex behind the eyes, concave farther back ; front edge prominent, three-lobed ; posterior margin narrow, emarginate. Eyes of moderate size, brown, the anterior a little larger, farther forward and farther apart, distant from the posterior by 3 or 4 diameters. Palpi large and broad, their bases rather wider than the head, their free part about equal to the length of the head, broad-ovate, blunt, the inner edge concave. Tentacle slightly tapered, strongly beaded, composed of 16 annuli, the free part about twice as long as the palpi ; distal annuli about 1½ times wider than long, the middle ones about ½ as long as wide. Antennæ similar but shorter, only their two distal annuli extending beyond the palpi. Upper tentacular cirri similar to the tentacle and of the same length, consisting of 15 annuli ; lower ones about ½ as long. Dorsal cirri on several (about 12) anterior segments mostly similar to the tentacle, but ¼ to ⅓ longer, and are equal to or considerably exceed the diameter of the adjacent segments. Along the rest of the body the dorsal

cirri are more unequal, but the larger ones are longer than those of the anterior segments, composed of 18 or 19 annuli, and often exceed the diameter of the body by $\frac{1}{4}$ of their length ; the shorter ones are about $\frac{2}{3}$ as long with 14 or 15 annuli.

The setæ of the anterior parapodia are numerous, long and slender, with delicate narrow-lanceolate blades, slightly bidentate at tip, the upper ones longer, breadth to length about 1 : 4 or 5, in the lower ones about 1 : 3 or 4. In the anterior parapodia there are also 3 or 4 slender acute acicula, side by side, but usually not projecting. Posteriorly the compound setæ become longer and slender, 7–9 in a fascicle, with larger and shorter blades, ratio as 1 : $1\frac{1}{2}$–$2\frac{1}{2}$, with the tips strongly incurved and distinctly bidentate. These are accompanied by 2 or 3 stouter spiniform acicula, one of which usually has the tip somewhat hook-shaped.

In the type the segments, commencing somewhat forward of the middle, from about the 33d segment, are crowded with ripe eggs, which are polygonal from pressure.

Œsophagus brown, rather long and large, occupying 7 segments, cylindrical, with a short stout tooth near the margin; edge divided into about 10 rounded lobes or scallops, recurved when extended. Soft pharynx with about 10 low, broad, rounded lobes.

The stomach is light greenish, deeply pigmented, and opaque, nearly $\frac{1}{2}$ as long as the œsophagus and more than twice as thick, occupying 5 segments, somewhat barrel-shaped, or elliptical, widest posteriorly and covered with an alveolar arrangement of polygonal glands separated by narrow dark lines so as to have a honey-comb-like appearance externally, unlike that of other species.

Color of the preserved specimens is plain yellowish-white.

Length of type, about 24^{mm} (caudal segments gone) ; diameter $.6^{mm}$.

This appears to be a species that does not produce special sexual zoöids. The large size and form of the head ; the character of the setæ ; and the alveolar surface of the stomach, are its most notable diagnostic characters. It appears to be rare.

Trypanosyllis tenella, sp. nov.

A small, slender species, with long beaded cirri, which is doubtfully referred to this genus on account of the strongly denticulated or scalloped margin of the œsophagus; in most other respects it closely resembles the young of *Syllis corallicola* and *S. catenula*, but it has a narrow stomach and the setæ are more bidentate, at tip.

Head small, the anterior portion nearly semicircular, deeply emarginate or cordate behind, well rounded in front, but with a slight median lobe, sides evenly rounded, most convex opposite the eyes, which are about equal, rather small, black, arranged in a short trapeze, the distance between the anterior and posterior about equal to two diameters ; a pair of minute black ocelli at the anterior margin in front of the antennæ.

Palpi large and long, lanceolate, regularly tapered, longer than the head, obtuse. Tentacle shorter than the antennæ, of 8 annuli, equal to the palpi, tapered, its distal annuli longer than broad. Antennæ similar, but about $\frac{1}{4}$ longer, of 13 annuli, about 3 or 4 distal annuli projecting beyond the palpi. Tentacular cirri long and slender with rounded annuli, about as long as broad ; upper ones, with 18 annuli, are longer than the antennæ, lower ones about $\frac{2}{3}$ as long. Dorsal cirri of segments 1, 3, 4, 6, and many others are longer than the tentacular cirri, composed of 22–28 annuli, and about twice as long as the diameter of the body; shorter ones irregularly alternating are $\frac{1}{2}$ to $\frac{2}{3}$ as long. Caudal cirri long and slender, tapered, similar to the longer dorsal cirri.

Setæ rather numerous, long and slender, all compound and similar ; the upper anterior ones have slender lanceolate blades with bidentate tips, ratio about as 1 : 4 or 5 ; of the lower ones about 1 : 3 or 4. Posteriorly the blades are shorter and the tips are more incurved and more strongly bidentate, with the denticles divergent, ratio about 1 : 2–$2\frac{1}{2}$; these are usually accompanied by 1 or 2 rather stouter spiniform acicula, with the tips slightly projecting, that of one usually somewhat hooked, the other only a little bent.

The œsophagus is rather long, occupying 8 segments, but not slender, wrinkled transversely in the type and somewhat contracted at each end ; its margin is emarginate on each side and is divided into a number of rather small, not very regular, obtuse denticles or scallops ; the tooth is close to the edge and rather small; the soft pharynx is divided into a circle of rounded lobes. The stomach is elongated, narrow, cylindric, occupying 8 segments, about equal in length to the œsophagus, and not much larger; its surface is covered with 50 to 55 close rows of opaque cell-groups ?. Color, in formalin, plain yellowish white. Length, about 11^{mm} ; diameter, $.6^{mm}$.

This species is very distinct from *T. vittigera* Ehlers, which is a large brownish species conspicuously marked by two transverse, narrow, white bands on each segment, and with the denticles of the œsophagus large and subtruncate. The setæ have short, bidentate blades. The latter was taken by us in considerable numbers.

T. gigantea McInt. (Chall. Voy.) as *Syllis*, appears to be closely allied to this last species.

Hemisyllis, gen. nov.

Similar to *Eusyllis*, but with the large palpi united together for about half their length in front of the head. Antennæ, tentacle, and anterior cirri long and beaded, as in *Syllis*; œsophagus straight, with the front edge serrulate; median tooth submarginal. Setæ few and simple, bidentate, without blades.

Hemisyllis dispar, sp. nov.

A small species with broad head and palpi, the lobes of the palpi projecting forward from the swollen common base which looks like a part of the head.

Head large and broad, the anterior half nearly semicircular; the front margin well rounded, apparently coalescent with the palpi in the middle; sides most prominent posterior to the eyes; posterior margin broadly convex. Eyes 4, small, black, in a trapeze, the anterior larger, not very close to the sides of the head; the posterior are very small, separated by about 4 diameters from the anterior ones. Palpi very large and wide, their bases thick and swollen, united together for about half their length, the front edge of the common base convex between the separated free lobes, which are narrow-ovate and obtuse.

Tentacle, antennæ, and all cirri are all similar in form, tapered and strongly beaded with rounded annuli, which on the middle and distal parts are as long as wide, or even longer than wide, and elliptical toward the end. The tentacle has about 20 beads and is about as long as the head and palpi combined; the antennæ are rather shorter, with 18 beads. The upper tentacular cirri are longer and rather stouter, with about 20 beads; the lower are about $\frac{2}{3}$ as long. The first dorsal cirrus is longer than the tentacular cirrus and has about 22 beads; its length is about $1\frac{1}{2}$ times the breadth of the segment; second cirrus is about $\frac{1}{3}$ as long, with 9 beads; third and fourth are rather longer than the second, with 14 beads; farther back they decrease rapidly, so that back of the stomach most of them are quite short, mostly with only 2–4 beads. The ventral cirrus is papilliform. Caudal end is lacking.

The setæ are few, small, and short; in the anterior region there is, in each fascicle, only 1 small bidentate seta (without blade, in the type), and 1 slender aciculum, with a small hooked tip, scarcely projecting.

The œsophagus is long and slender, occupying 7 segments; its edge is denticulated with small, unequal, acute teeth; median tooth

is small, close to the margin. The stomach is large, in length about equal to the œsophagus, long-elliptical, occupying 6 segments; it is covered with about 38 crowded rows of small, dark, round or elliptical glands. Color, yellowish white. Diameter of the type, .4^{mm}; the posterior half is lacking. Only one specimen was found.

Opisthosyllis Langerhans, op. cit., p. 541, 1879.

Palpi, body-segments, setæ, and cirri as in *Syllis* (*Typosyllis*). Œsophagus large and rather short, cylindrical, with the anterior margin entire; median tooth near the posterior end. Stomach large, its glands very distinct. Head pyriform, widest in front; palpi long and divergent. Buccal segment forms a collar.

Opisthosyllis nuchalis, sp. nov.

A large elongated species with numerous rather long, beaded cirri. Œsophagus large, showing as a conspicuous, brown, oblong patch on the back of the anterior segments.

Head pyriform, widest close to the anterior margin, which is truncate or slightly emarginate in the middle and on either side, so that it is slightly four-lobed; the sides are convex, narrowing backward, the posterior end narrow with a small emargination between two angular lobes. Eyes yellowish brown, small, nearly equal, prominent, with a convex lens; the anterior are wider apart, the four forming a trapeze. Palpi large, divergent, longer than the head, lanceolate, the distal half rapidly tapered, tips subacute, inner margins excavated.

The buccal segment is transversely narrow, and its anterior edge is extended forward as a rather broad, thin collar, conspicuous on the sides, where it extends as far forward as the anterior eyes and almost to the bases of the palpi, but receding dorsally, so as to expose the posterior eyes. The first and second setigerous segments are a little wider than the buccal and the breadth of the body suddenly increases at the third segment, where the end of the œsophagus is situated in the type specimen, but this is probably due, in part at least, to the pressure used in mounting it.

Tentacle and antennæ are slender, tapered, strongly beaded with small annuli, the distal ones are as long as broad, the proximal short and indistinct; the tentacle is considerably longer than the palpi, and contains about 24 annuli; the antennæ are but little longer than the palpi. Upper tentacular cirri are larger and about $\frac{1}{3}$ longer than

the tentacle, or about twice as long as the breadth of the buccal segment; lower ones about $\frac{1}{3}$ shorter. The first dorsal cirrus and most of the others on the anterior half of the body are longer than the upper tentacular cirrus and contain 36–40 annuli; these long cirri are regularly tapered, more or less curled, regularly beaded distally, and equal or somewhat exceed the diameter of the body. Others not more than half as long occur irregularly.

Setæ are all similar, long and numerous, 8–10 in a fascicle, larger than usual in this family, with rather short, wide blades, the ratio of width to length about as 1 : $2\frac{1}{2}$–$3\frac{1}{2}$; their tips strongly incurved, simple and acute. The posterior setæ and acicula are rather larger and longer than the anterior, but similar in form; two acicula, larger and more yellow than the setæ, occur in most fascicles; their tips are a little blunt or enlarged, and seldom project. Posteriorly there are often one or two simple acute setæ. The stems of the compound setæ are very oblique at the enlarged end, and have a rounded lobe just below the tip, on the outside.

The œsophagus is deep brown, as wide as the stomach and $\frac{2}{3}$ to $\frac{3}{4}$ as long, nearly cylindrical, but usually a little swollen in the middle and slightly contracted posteriorly. Its aperture is wide and nearly even, with a narrowly revolute entire margin. There is no anterior armature, but a small, rounded, highly refracting spot near the posterior end indicates the existence there of a posterior tooth, which bends inward and forward, with an acute tip, the base being much wider than the tooth itself.

The stomach is large and long, occupying about 12 segments, cylindrical, pale colored, covered with very distinct and well-separated roundish or elliptical groups of greenish glandular cells, arranged in about 70 pretty regular rows; on the posterior half a whitish line ususally runs along the middle of each row, so as to divide the most of the groups of cells into two nearly equal parts; anteriorly this line, or membrane, runs between the rows. Each glandular cluster seems to rise, with a narrow stem, from the center of a whitish, square or polygonal area, bounded by fine lines. They are arranged so regularly in quincunx that when not much magnified they have a tessellated appearance. Seen in profile the glandular groups are long-pyriform, with a narrow base. Other small irregular groups are scattered between the regular rows.

The color of the type specimens, in formalin, is yellowish white, with a dark brown oblong spot anteriorly, due to the œsophagus.

Length of the larger specimens, 20 to 25^{mm}; diameter, 1.4 to 1.6^{mm}.

In dead corals from the reefs.

Var. ? **gularis.**

One specimen, differently preserved, and much contracted, is rather deeply tinged with green, and has a narrow dark line across the front part of the anterior segments, and pale sutural lines; there is also a dark median stripe posteriorly. This was one of the specimens mixed with *Syllis cincinnata* and noted, in life, as having the anterior parts orange-red and the posterior olive-green (see page 610).

This may, perhaps, be an additional species of *Opisthosyllis.*

The posterior tooth of the œsophagus is more distinct. The stomach is much like that of the type described above. The cirri and antennæ are shorter and more curled, the longer ones about ½ the diameter of the body, but the entire body and the appendages are much contracted.

The anterior setæ are fewer, stouter, and longer than in the type of *nuchalis*, especially the upper ones, on which the blades are shorter and wider, with incurved tips, which are not bidentate.

The posterior setæ are decidedly longer and stouter than the anterior, with very oblique, shorter incurved blades, all with acute tips. Two stout acute acicula occur in the posterior fascicles; three in the anterior.

Length, as contracted, 10.5^{mm}; diameter, 1.2^{mm}; much longer in life.

Bailey Bay, at low-tide, in *Palythoa.*

Eusyllis (Synsyllis) viridula, sp. nov.

A small, very slender, pale green syllid with short, slender dorsal cirri scarcely longer than the breadth of the body; œsophagus long, slender, with the margin minutely denticulated; stomach long; palpi rather short.

The head is transversely elliptical, with the middle of the front margin slightly prominent and the posterior margin a little emarginate. Eyes small, light brown.

Palpi separate to base, nearly regularly broad-ovate, about as long as the head, obtusely rounded at the end and not concave on the inner margin.

The antennæ are scarcely tapered, rather short, about equal to the breadth of the head, projecting somewhat beyond the palpi, consisting of about 9 annuli, the distal ones well defined. The upper tentacular cirri are about ⅓ longer and rather stouter; the lower ones are about equal to the antennæ in size and length.

The dorsal cirri on segments 1–4 are rather more slender than the upper tentacular cirri but of about the same length and about equal

to the breadth of the body, with well-defined annuli, those on the distal portion being rather longer than broad. Farther back the cirri gradually become shorter and more slender, but unequally so, longer and shorter ones often alternating, the longer ones scarcely equal to $\frac{3}{4}$ the breadth of the body, composed of about 12 annuli, the shorter about half as long. Back of the gastric region the cirri become shorter and more nearly alike, equal to about $\frac{1}{3}$ to $\frac{1}{4}$ the breadth of the adjacent segments, composed of 6 to 8 annuli, tapered, and subacute. The ventral cirri are ovate, nearly as long as the setigerous lobes. The parapodia are large and the segments are rounded and separated by well marked constrictions.

The setæ are few ; in the anterior fascicles there are usually 4 or 5, all compound, with slender stems ; the upper ones have slender lanceolate blades, 4–6 times as long as wide; the lower ones have shorter blades, 2–2½ times as long as wide; the tips are incurved and most of them are very minutely bidentate. One or two slender subacute acicula are usually present, but they rarely project beyond the ends of the parapodia. Posterior to the stomach the setæ are reduced to 2 or 3 long compound ones, with very short blades ; from segments 20–22 they are replaced by 1 or 2 simple bidentate setæ or crotchets, but compound setæ may have existed on the lost caudal segments; the posterior setæ are much longer than the anterior, with a much stouter stem, terminating in a bifid or two-pronged tip, evidently due to the consolidation of a short blade with the stem. There are usually two stout acicula, one with a blunt tip and the other hooked.

The œsophagus is very long and slender, occupying about 12 segments ; it has a bulbous swelling a little back of the anterior end ; the margin is a little emarginate, with the dorsal side longer; the edge is finely denticulated ; the tooth is large and elongated, acuminate, with a sharp tip which projects beyond the edge. The stomach is nearly opaque, whitish, rather long and thick, occupying 6 segments. It is covered with about 38 rows of distinct rounded groups, separated by definite narrow lines of green cells, which unite in the median line to form a row of angular groups.

The color in formalin is pale green with a darker green line across the middle of each anterior segment, above; stomach opaque, whitish.

Length of the type, without caudal segments, 15^{mm}; diameter, .5^{mm}.

Eusyllis (Synsyllis) longigularis, sp. nov.

Body long and slender with short dorsal cirri, and a long slender œsophagus, minutely denticulate at the margin. Head small, rather

wider than long, and slightly trilobed anteriorly, emarginate posteriorly. Eyes small, black, the anterior ones a little larger and farther apart. Palpi large, divergent, the free part rather longer than head, the inner margin concave, tips obtuse. Tentacle slender, tapered, rather short, extending about to ends of palpi. Antennæ tapered, somewhat shorter and smaller, distinctly beaded, with 8 to 10 annuli. Upper tentacular cirrus similar in form, about twice as long as tentacle, with about 15 annuli; lower one smaller, about $\frac{1}{2}$ as long, with 8–10 annuli. The first and some of the other dorsal cirri are as long as, or longer than, the dorsal tentacular cirri, and equal to about twice the breadth of the first segment. In the type longer cirri occur on segments 1, 2, 4, 6; shorter ones on 3, 5, 7, 8. Farther back the longer dorsal cirri are mostly less than the diameter of the body, and on the posterior half they are equal to about $\frac{1}{2}$ the diameter of the corresponding segments. They are all tapered and neatly beaded. Caudal cirri larger than the adjacent dorsal cirri and twice as long.

The anterior setæ, 5–7 in a group, have the blade narrow, nearly straight, 3 to $3\frac{1}{2}$ times as long as broad; shorter below and on the more posterior segments; the tips minutely bidentate. Setæ beyond the 20th segment are reduced to 2 or 3 in each fascicle, much longer and stouter than the anterior ones and about equal to the dorsal cirri; the longer one is a two-pronged crotchet; on the compound ones the blades are short, ratios $1:1\frac{1}{4}$–$1\frac{3}{4}$, the tips bidentate; on the last 10 segments the setæ are all compound. They are accompanied by 1 or 2 spiniform acicula.

The œsophagus is brown, very long and slender, occupying about 13 segments; its tooth is near the front margin, which is unevenly finely serrulate with about 16 denticles. The stomach is narrow, cylindrical, rather short, occupying about $5\frac{1}{2}$ segments,* with many crowded rows of small cell-groups and a median sulcus. Color, yellowish white. Length, in formalin, about 15^{mm}; diameter, $.5^{mm}$.

Branchiosyllis lamellifera, sp. nov.

A small greenish syllid with compact segments, wide truncated head, blunt falcate palpi, beaded dorsal cirri, and large parapodia, having a leaf-like gill on their anterior side. Setæ with short blades.

Head large, broader than long, widest near the front; the anterior margin nearly straight, but has a small rounded lobe in the middle;

* The number of segments occupied by the stomach or œsophagus varies considerably in all the species, owing to the great contractility of the segments. It is a character of some value, however, if taken relatively.

sides rounded, but narrowing backward, posterior margin cordate-emarginate in the middle. Eyes 4, rather large, nearly black, placed in advance of the middle, nearly in a transverse row, the posterior ones being $\frac{1}{3}$ smaller and a little farther back, distant less than their diameter from the others. Palpi broad, obtuse, with the inner edge incurved and the ends usually bent downward, the free part about as long as the head.

The tentacle is short, tapered, scarcely longer than head, reaching but little beyond the ends of the palpi, basal part not beaded, the two or three distal beads more evident. Antennæ like the tentacle, but shorter.

Tentacular cirri are large, but not very long, scarcely tapered; the upper one is about $\frac{1}{3}$ longer than the lower, composed of 14 annuli, the distal ones being nearly as long as broad, and separated by deep constrictions. The first dorsal cirrus is similar to, and about $\frac{1}{5}$ longer than the upper tentacular cirrus, or about $1\frac{1}{2}$ times longer than the diameter of its segment; the second is less than $\frac{1}{2}$ as long; the third is longer than the first. Farther back the cirri are variable in length, part of them being rather longer than the breadth of the body and others not half as long, of about 10–12 annuli. The parapodia are large and prominent; the setigerous lobe terminates in two small papillæ; the ventral cirrus is stout and nearly as long as the setigerous lobe.

The gill is present on all the segments; beginning as a small rounded lobe anteriorly, it increases to an ovate form a little farther back; along the middle region of the body it becomes much larger, broad, foliaceous, with three or sometimes four lobes, becoming more simple and smaller posteriorly. The larger ones are as long as the thickness of the parapodia and considerably wider.

Setæ are large and long. The compound ones, of which there are usually 2 to 4, have a small and short incurved blade, wider at base, with an acute, hook-like tip; the length is about equal to the breadth. With these there are one or two somewhat stouter, acute acicula, with the tips slightly bent and projecting but little or not at all beyond the setigerous lobes.

The œsophagus is small, cylindrical, short, occupying 5 or 6 segments, light colored, cylindric, with a stout, conical tooth near the dorsal edge; the margin is indistinct, but appears to be finely irregularly denticulated. The stomach is thick, pale in color, and slightly longer than the œsophagus, occupying 6 segments.

Color, in formalin, light green, with indication of a broad, darker greenish band across each segment; in one specimen there is a pale line between the segments and a row of darker roundish spots with pale centers along each side; the gills were apparently dark green. The color in life was not noted.

Rare, only three specimens seen, none perfect.

It is closely related to *B. oculata* Ehlers, from Florida, described from a single small, imperfect specimen, but the latter has smaller and shorter simple gills, and a differently shaped head.

Desmosyllis longisetosa, sp. nov. (See p. 635.)

A small, slender, 6-eyed species with long, well-beaded antennæ and dorsal cirri; setæ of two kinds, compound and simple; the upper anterior have long, slender, acute blades.

Head broader than long, widest in front of middle, with the posterior border emarginate and the front with a medial lobe. Palpi short and broad, oblong ovate, united for about $\frac{1}{3}$ their length, wider than the head and about as long. The four larger eyes are black and conspicuous, though small, the anterior are a little larger and much farther apart, though only a little farther forward; the third pair are minute, situated at the bases of the antennæ. The tentacle is large and long, 5 or 6 times as long as the head, composed of about 28 annuli, of which 23 are beyond the ends of the palpi; the annuli are mostly about $1\frac{1}{2}$ times wider than long, but the distal ones are about as long as broad, elliptical, with deep constrictions between.

The antennæ are similar and nearly as stout as the tentacle and about $\frac{3}{4}$ as long, with about 24 beads. The upper tentacular cirri are like the tentacle and longer, projecting forward nearly as far; the lower ones are about half as long. The dorsal cirri are all long and strongly beaded, but those of the first 10 segments are particularly long, some of them being nearly twice the length of the upper tentacular cirri and 5 or more times as long as the diameter of the body, with about 38 annuli; those left near the posterior end are about 4 times the diameter of the corresponding segment, but most are lost posteriorly.

Ventral cirri slender, tapered, nearly as long as the setigerous lobes. Setæ are numerous and long; those of the anterior fascicles have the free part longer than half the diameter of the body; the posterior are equal to the breadth of the corresponding segments; the upper anterior setæ have long, narrow, straight blades, 8–10 times as long as wide, with the tip incurved and faintly bidentate; the

lower ones have the blades only 4 to 6 times as long as wide; the posterior fascicles have numerous similar compound setæ and also one slender, acute, simple straight seta, usually rather shorter than the rest; a smaller simple seta occurs in many anterior fascicles.

The œsophagus is short, with a median tooth, but its margin could not be distinctly seen. The stomach is short, occupying about 6 segments, strongly elliptical, covered with regular rows of squarish cell-clusters.

Odontosyllis enopla, sp. nov.

A large species with a dark brown, wide, short œsophagus, armed with a ventral row of six stout, recurved, hook-like teeth anteriorly, besides the median dorsal tooth.

Head large, broader than long, broadly rounded in front and on the sides; posteriorly with two rounded lobes, separated by a small median emargination. Eyes black, unequal, the anterior ones much the larger, reniform; those of each side are so close together that they seem to be almost in contact.

Palpi shorter than the head, rather wide, thin, often wrinkled or folded in contraction, and commonly curved downward.

Tentacle tapered, rather slender, not annulated, its length about $1\frac{1}{2}$ times that of the head. Antennæ similar, about $\frac{1}{2}$ as long. Tentacular cirri similar to the tentacle, the upper one rather larger and longer; the lower ones shorter; first dorsal cirrus decidedly longer and larger than the upper tentacular cirrus. Succeeding ones mostly shorter, unequal, alternately shorter and longer, tapered distally; the longer ones are equal to the breadth of the body, the shorter ones about $\frac{1}{2}$ as long; those on setigerous segments 3, 4, 6, 9 are longer than the others.

The setæ are all similar, numerous, slender, short, projecting but little beyond the parapodia, with short rather wide blades, ratio as $1 : 2\frac{1}{2}$–3; their tips are strongly incurved and acute, with a small denticle a little distant from the end. Two spiniform yellow acicula usually occur in each fascicle.

The œsophagus is short and occupies about 4 segments; its margin is incurved and strongly emarginate dorsally. It bears a group of 6 nearly equal, parallel, recurved hooks or teeth, which are large and strong. The conical dorsal tooth is near the margin.

The stomach is large and occupies 8 segments; it is wide, elliptical, and about twice as long as the œsophagus. Its surface is cov-

ered with angular or alveolar markings, often hexagonal, so as to have a honeycomb-like appearance, but not arranged in definite rows.

Color, in formalin, is nearly white, except when containing eggs.

Length, 25^{mm}; diameter, about 1.5^{mm}.

One of the largest specimens has all the segments back of the gastric region filled with eggs.

Odontosyllis brachydonta, sp. nov.

Similar to *O. enopla* in size and form, but easily distinguished by the very short tapering œsophagus and the much smaller size of its ventral teeth, and by the 4 well separated eyes.

Head large, but smaller and narrower than in *O. enopla*, deeply emarginate in front and with two prominent lobes, most prominent and somewhat angular in front of the anterior eyes; sides broadly convex; posterior margin cordate-emarginate.

The buccal segment extends forward as a collar with median and lateral lobes. Tentacle without articulations, stout at base, rapidly tapered, in length about equal to the breadth of the head. Antennæ similar, about $\frac{1}{3}$ shorter. Upper tentacular cirri and many of the dorsal cirri are larger and $\frac{1}{4}$ to $\frac{1}{3}$ longer than the tentacular cirri, but similar in form, usually curled in contraction; the longer ones exceed the diameter of the body. Setæ numerous and crowded, slender, with small and short blades, ratio about 1 : 2–3; the tips are distinctly bidentate, with the denticle somewhat removed from the strongly incurved tip. Œsophagus dark umber-brown, very short, about as broad as long, with the base nearly twice as broad as the anterior end; its edge is narrowly revolute; the 6 ventral teeth are small and short, with angular bases, in a regular row; the four central teeth are larger than the lateral; median tooth near the dorsal margin. Stomach large, long-elliptical, light colored, shorter than in *enopla*.

The only specimen found has lost the caudal portion. It is similar to *O. enopla* in size. Each anterior segment is crossed by a narrow dark line.

Grubeosyllis nitidula, sp. nov. (See p. 634.)

A very small, slender, nearly smooth species, consisting of about 25 setigerous segments; the antennæ and all the cirri fusiform with slender acuminate tips; eyes large, black; setæ with relatively long blades.

Head rather large for the body, evenly rounded in front and on the sides, subtruncate posteriorly. Eyes are conspicuous; the anterior ones are about twice as large as the others and farther apart, the distance between being about equal to the diameter of a posterior eye.

Palpi large, broader than the head, united together nearly to the tips, which are separated by a notch or emargination; the length of the projecting portion is equal to the length of the head.

Tentacle is as long as the head and palpi combined, slender, somewhat fusiform proximally, the tip long and acuminate, without distinct annulations, but with some very minute rough points. Antennæ similar in form, but about $\frac{1}{5}$ shorter. Tentacular cirri two on each side, of about the same length, and like the antennæ in size and form. First dorsal cirrus like the tentacular cirri, but about $\frac{1}{3}$ longer. The following cirri are about equal to the tentacle in length, or nearly equal to the diameter of the body; nearly smooth, but showing a few scattered, minute, conical papillæ when highly magnified. The anterior parapodia are rather long, equal to about $\frac{1}{3}$ the breadth of the segment.

The compound setæ are long and rather numerous; the upper ones have a long, slender, nearly straight, acute blade, ratio about 1 : 8–12; the lower ones have shorter blades, ratio 1 : 5–6. In most fascicles there is also a single, slender, needle-like seta, about as long as the others.

The œsophagus is short and rather stout, occupying about 3 segments, and in length about equal to the stomach, which is thick and nearly cylindrical, occupying $2\frac{1}{2}$ segments; it is covered with close rows of dark clustered cells.

Grubeosyllis rugulosa, sp. nov.

A very small species with 28 segments, with the dorsal surface of the body and cirri roughened with minute conical papillæ.

Eyes well developed, dark brown, close together. Palpi large, united nearly to the tips, longer than the head, a little broader than long. Tentacle and antennæ of about the same form and size, shorter than head, fusiform, with a small acuminate tip. Tentacular cirri short, similar to the tentacle in size and form, nearly equal. Dorsal cirri all short and much like the tentacular cirri.

The compound setæ are rather long and slender, usually 4–6 in a fascicle; in the anterior fascicles the upper ones have rather long, narrow, slightly curved blades, and the lower ones blades about half as long and more incurved; posteriorly they are all shorter and

more incurved. In each fascicle there is usually one slender, needle-like, acute seta, nearly as long as the others.

The œsophagus is rather short, but $\frac{1}{3}$ longer than the stomach, with a large tooth. The stomach is short elliptical, as broad as long, and occupies but one segment. The parapodia and setæ are prominent, especially posteriorly, where they are as long as the breadth of the body; anteriorly they are about $\frac{1}{2}$ its breadth.

Length, 3^{mm}; diameter, $.2^{mm}$.

Only one specimen was found.

Autolytus (Proceræa) simplex, sp. nov.

A small, slender species with long slender tentacle and antennæ, and three pairs of cirri that are still longer, other dorsal cirri short. Head small and rounded; eyes black, rather large, those of the same side in contact or nearly so, the anterior a little larger; a few black pigment cells at the front border of the head may represent a pair of ocelli. Palpi small, rounded, united.

Antennæ and tentacle similar, long, slender, smooth, scarcely tapered, with slight indications of articulations, three or four times as long as the head and palpi combined. Tentacular cirri similar to the tentacle in size and form, the upper ones nearly twice as long; lower ones about equal to the antennæ. First and second dorsal cirri are like the upper tentacular cirrus, or a little longer. All the succeeding cirri are small and very short, the length from $\frac{1}{6}$ to $\frac{1}{2}$ the diameter of the body. Caudal cirri long and tapered, distinctly annulated.

The setæ are all essentially alike; anteriorly there are 6–8 in a fascicle, with the stems slender and subclavate, the blades are small and very short, ratio about as $1 : 1\frac{1}{4}$ to $1\frac{1}{2}$; their tips are slightly incurved and minutely bidentate at the end.

The œsophagus is long, slender, and folded, occupying 11 segments. The stomach occupies 5 segments; it is rather short, cylindrical, narrowed at both ends, with numerous close, narrow rows of glands.

The bases of the parapodia back of the stomach are swollen, rounded, and dark colored, causing a conspicuous lateral row of spots on each side, which extend forward nearly to the head.

A constriction occurs at the 40th segment, indicating the formation there of the head of a sexual zoöid, which has two small eye-specks, but no special appendages are present. The zoöid contains 21 segments and is already full of eggs.

Length, 5^{mm}; diameter, $.25^{mm}$.

In addition to the numerous species of Syllidæ described above, there are, apparently, single specimens of several others, but some of them are not perfectly preserved, and others are so contracted that essential features, like the armature of the œsophagus, cannot be made out without destroying the specimens. Among these there are, apparently, another *Trypanosyllis*, an *Autolytus*, and perhaps an additional *Eusyllis*. Many additional Syllidæ will probably be discovered at the Bermudas when carefully sought for, especially at different seasons of the year.

Autolytus (Proceræa) rubropunctatus (Grubé).

Sylline rubropunctata Grubé, Arch. fur Naturg., 1860, I, p. 87, pl. iii, fig. 8.

Autolytus (*Proceræa*) *ornatus* Mar. & Bobr., Ann. Sci. Nat., Ser. 6, II, p. 44, pl. v, figs. 14–14d, 1875, (*non* Verrill, 1874); St. Joseph, Ann. Polych. Cotes Dinard, Annales des Sci. Natur., Ser. 7, vol. 1, p. 220, pl. x, figs. 98, 99, 1886.

Proceræa rubropunctata Lang., Zeits. fur Wissen. Zoöl., xxxii, p. 579, pl. xxxii, figs. 30*a*, 30*b*, 1879.

This European species has also been recorded from Beaufort, N. C., and is, therefore, likely to be found at the Bermudas.

It is peculiarly marked with a transverse row of four orange spots on each segment, and has larger palpi than usual in this group.

The species originally named *Stephanosyllis picta* V. in 1874, was soon afterwards changed by me, (Amer. Jour. Sci., 1874) to *Stephanosyllis ornata*. Since *Proceræa* and *Stephanosyllis* are now generally considered synonymous, that specific name cannot be used for the European species. It should be designated as above indicated.

Our New England species may bear the name *A.* (*Proceræa*) *ornatus*, unless some reliable characters can be found for the separation of *Stephanosyllis*.

Analytical table of the Genera of Bermudian Syllidæ, described above.

I.—Palpi large, separate to their bases.

A.—Œsophagus with only a single median tooth. Antennæ and cirri moniliform.

B.—Parapodia without a branchial lobe.

C.—Median tooth near anterior end of œsophagus.

D.—Margin of œsophagus entire or nearly so. *Syllis.*

a.—Setæ all compound and similar, but differing somewhat in relative length of blades. Subgen., *Typosyllis.*

aa.—Upper anterior setæ with abruptly longer, narrow blades. Subgen., *Ehlersia.*

aaa.—Setæ few, simple, without blades; end bidentate. *Haplosyllis*, sp.

DD.—Margin of œsophagus dentate or serrulate.

b.—Margin serrulate or finely dentate.

c.—Setæ all, or in part, compound. *Eusyllis.*

cc.—Anterior setæ compound; those of middle region mostly two-pronged crotchets. *Synsyllis.*

ccc.—Setæ few; all simple with bidentate ends. *Haplosyllis.*

bb.—Margin strongly dentate or scalloped.

d.—Œsophagus straight. *Trypanosyllis.*

dd.—Œsophagus folded, slender. *Pterosyllis.*

CC.—Median tooth of *œsophagus* near its posterior end; margin entire; opening wide. A buccal collar. Setæ mostly compound; blades acute. *Opisthosyllis.*

BB.—Parapodia with a branchial lamella. Setæ all compound, with acute, claw-like blades. *Branchiosyllis.*

AA.—Œsophagus short, with a ventral row of recurved teeth. Cirri not moniliform. Setæ compound, with acute, incurved blades. *Odontosyllis.*

II.—Palpi large, more or less united medially. Œsophagus with a median tooth.

e.—Palpi only partially united. Antennæ and cirri long, moniliform.

g.—Setæ all simple with bidentate ends. *Hemisyllis.*

gg.—Setæ mostly compound; simple setæ acute. *Desmosyllis.*

ee.—Palpi united nearly or quite to their tips. Antennæ and cirri short, fusiform, not moniliform. Buccal segment distinct, with 2 pairs of tentacular cirri. *Grubeosyllis.*

III.—Palpi small, or rudimentary, or wanting.

E.—Head normal; œsophagus and stomach well-developed. Stem-form of *Autolytus.*

EE.—Head abnormal. Eyes large. Œsophagus and stomach wanting or rudimentary. Capillary setæ usually present. (Sexual zoöids.)

f.—Antennæ and tentacular cirri present. ♀ *Autolytus.*

ff.—Antennæ and tentacular cirri absent. *Tetraglene.*

fff.—Tentacular cirri absent. *Chætosyllis*

Remarks on certain genera of Syllidæ.

Amblyosyllis Grubé *non* Langerhans.

The genus *Amblyosyllis* Grubé (Vidensk. Meddel. Naturhis. For., Kjobenhavn, 1857, p. 186) seems to have been misunderstood by later writers. It seems to be widely different from the genus of that name as defined by Langerhans and adopted by others.

As originally established it included only *A. rhombeata* from St. Croix. It was said to agree with *Syllis* as to its body, parapodia, cirri, and setæ, but the cephalic lobe is coalescent with the buccal segment, and palpi are wanting. "Tentacles 3, tentacular cirri 2, eyes 2." Under the specific description these characters are reaffirmed. The tentacular cirri are again said to be 2 "(utrinque 1)." The setæ are numerous, compound, with long linear blades. The body-segments are few (14). The two eyes are large, oval. The tentacles (antennæ) and cirri are long and imperfectly articulated or "crenulated."

It is, perhaps, the sexual zoöid of some better known genus, but the single pair of tentacular cirri and eyes, and the absence of distinct palpi are characters entirely at variance with the genus *Amblyosyllis* of Langerhans, unless it be arbitrarily assumed that it was very badly described.

The latter is made nearly equivalent to *Pterosyllis* Clap. and nine species were referred to it, besides Grubé's type. As defined, it scarcely differs from *Trypanosyllis*, except in having a long, folded œsophagus. But it has *two pairs* or *three pairs* of eyes; *two pairs* of tentacular cirri; a *distinct* buccal segment; and two *free, separate* palpi, which are usually small and bent down under the head.

To this genus of Langerhans belongs the elegant New England species, *Pterosyllis cincinnata* Ver. (1874, p. 394, and 1881, p. 308). The latter has rather small, but distinct, palpi; six eyes; and very long moniliform cirri.

Until the original species of Grubé can be reexamined, it would appear to be far better to retain *Pterosyllis* for the northern genus, for it is probable that there are still numerous unknown generic types of annelids in the West Indies.

Grubeosyllis V., nom. nov.=**Grubea** Quatr.

The name *Grubea* Quatr., 1865, was preoccupied by *Grubea* Diesing, 1858, a genus of trematode worms. Therefore I propose to substitute for it *Grubeosyllis*. (See the analytical table, p. 632, for the generic characters.)

Several species occur on the U. States east coast; among them are *G. Websteri* V.; *G. maculata* V., sp. nov., which is a stouter species, but similar to the last; has a larger and wider head and larger eyes, and a large buccal segment, on which there are four dark ovate spots; the antennæ and cirri are longer and have a middle band of brown with acuminate, acute tips; and *G. fusca* V., sp. nov., which is distinguished from both by its shorter and wider palpi and head, more swollen and shorter antennæ and cirri, shorter and more elliptical stomach, and by having crowded brown spots on its dorsal surface, becoming fewer in front of the stomach, and by its large anterior eyes.

There are also several Mediterranean and Madeira species, as *G. fusifera* (Quatr.); *G. clavata* (Clap.); *G. dolichopoda* Marentz., also recorded from New Jersey by Webster; *G, pusilla* (Duj.); *G. tenuicirrata* (Clap.); *G. limbata* (Clap.). By Langerhans the first three of these European species are considered identical.

Eusyllis Malmgren.

Under this genus there are now included several diverse groups that agree in having the anterior margin of the œsophagus finely denticulated but differ in their setæ, cirri, palpi, etc.

Eusyllis, typical subgenus.

If we consider as type, the first of the two species of Malmgren (*E. Blomstrandi*), in which the antennæ and cirri are not moniliform and the non-sexual setæ are mostly compound with bidentate blades, the genus would scarcely differ from *Pionosyllis* Malmg., of the same date, except in the serrulation of the œsophagus. *Pionosyllis* was originally separated mainly on account of its capillary setæ, now known to be only a sexual character. It may be said to be a *Syllis* without articulated cirri.

As it is convenient to have a distinctive name for this particular type, I propose to consider it a subgenus, *Eusyllis*, differing from the next group in having the appendages imperfectly articulated. Besides the compound setæ there is an acute simple seta and often a bidentate one in the posterior fascicles. Saccular gular glands are lacking alongside the œsophagus.

The second species described by Malmgren was *E. monilicornis.* It has been redescribed by others and is better known than the first species. Its palpi are separate nearly to their bases; the cirri are

more distinctly articulated; its setæ are partly compound with bidentate tips, as in *Syllis*, and partly simple, with bidentate or forked ends.

Synsyllis, subgen. nov. Type **S. viridula** V.

E. viridula Ver., described above, p. 622, and *E. longigularis* (p. 624), differ from the type chiefly in having posteriorly mostly simple forked setæ or crotchets, like the stem of a compound seta having a short blade consolidated with it; and by having regularly beaded cirri and large, entirely separate palpi, as in *Syllis*.

Langerhans (1879, p. 550) united *E. Blomstrandi* and *E. lamelligera* Mar. and Bobr., which differ so considerably that it seems impossible they can be identical. St. Joseph, op. cit., p. 171, clearly separated them. Malmgren's species is described and figured as having entirely separate palpi, while *E. lamelligera* is represented as having them united for nearly half their length; the latter also has flat, large, differentiated ventral cirri on the first parapodia, and a pair of large saccular gular glands. These characters would indicate a generic difference.

Desmosyllis, gen. nov.

Type *D. tenera* Ver., Brief Cont., 53, p. 368, 1882, (as *Eusyllis*). Two species from our coast—*D. tenera* Ver. and *D. fragilis* (Webs. 1879, as *Syllis*) agree in having the large palpi united for about half their length, and in having long, regularly articulated antennæ and cirri. Most of the setæ are compound with bidentate blades, as in *Syllis*. In *D. longisetosa*, (see page 626) there is also a single, long, needle-like seta in most of the fascicles.

For this group, which I think ought to rank as a distinct genus, I propose the name *Desmosyllis*. To it may belong *D. lamelligera* (Mar. and Bobr.) referred to above, though in the latter the cirri are less strongly articulated. But the partial union of the palpi is a character of much greater importance.

Hemisyllis Ver. See p. 619, above.

The Bermuda species, described above as *Hemisyllis dispar*, also has the palpi half-united, but it has only a few, simple, unequally bidentate or birostrate setæ, all alike, as in *Haplosyllis*. Like the latter, it inhabits sponges.

Marphysa regalis, sp. nov.

A highly iridescent, large, robust species, composed of about 125 to 130 segments, narrowed close to the head. The branchiæ begin at about the 20th segment; becoming trifid at about the 25th or 26th segment, and 4-branched at about the 45th, continuing as a simple cirrus, on a large number of more posterior segments. In the adult some branchiæ are 5-branched.

Head narrowed, with two deeply separated, rounded front lobes. Three median antennæ are about equal, tapered, articulated, with about 5 oblong annuli, not deeply constricted; length about one-half the breadth of the buccal segment; outer antennæ similar, about one-quarter shorter.

The buccal segment is as long dorsally as the next two, or as long as the next three at the sides.

From 18 to 22 anterior setigerous segments are without branchiæ. The first branchiæ are usually bifid in the adult, but simple in immature individuals; bifid branchiæ continue to about the 25th or 26th setigerous segments, where they become trifid, with long, slender, nearly equal branches, and these may continue for a large number of segments, but in the fully adult specimens they become 4-branched on a number of segments back of the 45th, and a few sometimes have 5 cirri. Posteriorly they gradually decrease; being simple on about 40 segments, and wanting on the last 60 segments.

The dorsal cirri on the anterior 20 segments are rather long, thick at base, rapidly tapered or acuminate distally, and faintly annulated; in the branchial region they become smaller and more conical. The first pair of ventral cirri are rather long, equal to the setigerous lobe; a little farther back they became low, broad, verruciform with a small, papilliform terminal joint.

The setæ in the branchiated segments are numerous; in the upper fascicle the longer capillary setæ have rather long and slender acuminate tips; they are accompanied by a number of brush-shaped setæ with wide ends. In the lower fascicle all the setæ are compound, and have rather stout stems, with enlarged sublanceolate ends; blades oblong-lanceolate, the ratios as 1 : 4–5, with the tips strongly bidentate. Each fascicle has a large, black, spiniform aciculum, that of the upper fascicle larger and less acute; their tips project somewhat, as preserved.

Color, in formalin, brownish or flesh-color, mottled with darker, with a brilliant iridescence. The surface, under a lens, appears minutely punctate, and is finely specked with whitish dorsally.

Length, in life, over a foot (+300^{mm}).

Breadth of a large but imperfect specimen, in the branchial region (40th segment) is 9^{mm}; of buccal segment, 4^{mm}.

Heteromarphysa, gen. nov.

Body slender; five antennæ (or tentacles) and a pair of separated ventral palpi. Head rounded in front. Eyes 4, well-separated. Buccal segment large, united to the head dorsally, and to the next segment without a visible suture (as preserved). Branchiæ lacking. Setæ of several sorts—compound, capillary, and uncinate; ventral ones in the anterior fascicles, compound. Jaws similar to those of *Paramarphysa.*

Heteromarphysa tenuis, sp. nov.

Slender and rather long, with elongated segments, separated by constrictions, except the first four, which are nearly continuous, (perhaps due to imperfect preservation).

Head about as broad as long, obtusely rounded in front, with a minute median emargination; posterior margin more broadly rounded; widest behind the middle. Eyes 4, small, black, nearly equal, nearly in a square; the anterior ones situated close to the anterior margin; the others, rather farther apart, are behind the outer antennæ. The palpi are rounded, about as long as wide.

The jaws are mostly soft and light colored, but appear to agree closely with those of *Paramarphysa.*

Antennæ very long and slender, tapered, acute, smooth, not articulated, but attached to a large and long base. The inner paired ones are the longest, being about 5 times the breadth of the head; odd one somewhat shorter; outer ones about one-quarter the length of the longest.

The buccal segment is wider than the head and continuous with it.

Two tentacular cirri are present on one specimen; they are very long and slender. The larger specimen has 47 segments, but the posterior end is gone. Another smaller entire one has 38 segments.

The parapodia are longest and largest on the anterior segments, decreasing rapidly, but not abruptly, in length after about the 7th.

The dorsal and ventral cirri are about equal on the anterior six segments, rather long, tapered, enlarged at base and tapered distally. On following segments the dorsal cirri become gradually shorter and thicker, and are nearly obsolete after the 12th, but the ventral cirri become smaller and more slender and continue to the end of the body.

The ventral fascicles, on the anterior 3 segments, have 4 or 5 compound setæ, with strongly curved blades, 4 or 5 times as long as wide, with a strongly incurved bidentate tip. The upper fascicle contains a few small capillary setæ. On the 4th segment there are one or two shorter compound setæ with smaller blades, and a few acute capillary setæ with the shaft thickened and bent distally, and a group of longer and more slender ones in the upper fascicle. Uncinate setæ with the tips bidentate and limbate commence on the 11th segment, where there is only one, but they increase to 2 or 3 farther back, and then decrease to 1 posteriorly. All the setæ are larger and longer on segments 6 to 12; there are also 2 or 3 compound setæ with acute capillary blades on segments 8 to 10.

Color, in formalin, greenish white, with paler, fine, sutural lines and a darker dorsal stripe; an obscure darker spot at the base of each of the parapodia.

Length of the longer imperfect specimen, 11^{mm}; diameter, 6^{mm}.

Flatts Inlet beach, in shell-sand, at low tide; 2 specimens.

Leodice or **Eunice.**

Eunice Cuvier, 1817, *pars*, = *Leodice* Savig., 1820, emend. Malmgren.

The Bermuda species belong to the genus *Leodice*, as restricted by Malmgren, who restricted *Eunice* to the type of *E. gigantea*. The name *Eunice* was in prior use by Hubner for a genus of insects, in 1816, and its use may have to be abandoned for the annelids.

At least 21 nominal species of *Eunice* have been described from the West Indies, Florida, and Bermuda; 3 by Schmarda, 1861; 1 by Baird, 1870; 4 by Œrsted and Grubé, 1879; 2 by Pourtales; 4 by Webster, 1884; 2 by McIntosh, 1885; 5 by Ehlers, 1887. Ehlers* has also redescribed and admirably figured several of the species previously described by Œrsted and Grubé and by Pourtales.

In consequence of the three later works appearing so nearly together, several of the species have received two or three names. The difficulty of identification is, in some cases, much increased by the fact that several of the species which actually grow to large size, have been described from very small and immature specimens, only one or two inches long, and in some cases even these were mere fragments of a single individual, so that no account could be taken of individual variations or of differences due to age.

* Memoirs Mus. Comp. Zoöl., vol. viii, 1887. In this work nine species are included; eight species are very fully described and figured.

Our Bermuda collection contains several common species that grow to the length of 8 to 12 inches or more, which, indeed, seems to be a common size for the species of this genus.

The commonest large reef-species are *L. longisetis* W.; *L. mutilata* W. = *E. barvicensis* McInt.; *L. violaceomaculata* Ehl.; *L. denticulata* W. = *L. filamentosa* (Œrst. and Gr.) = *E. cirrobranchiata* McInt. We did not find *L. longicirrata* (Webst.).

Webster also recorded *E. violacea* Œ. and Gr. from Bermuda, but this large species was described from the Pacific coast of Central America. It has a 4-lobed head and very large pectinate branchiæ, with 20–28 branches. No such species was found by us. Webster gives no description of his examples, therefore it is impossible to tell what he had, without a re-examination of his specimens, but it may have been *L. violaceomaculata* (Ehl.). This is a very large species that is not uncommon. It has a bilobed bead ; the branchiæ are all pectinate and the larger ones have about 20 branches ; the first appear on segments 6 to 9 ; the dorsum is curiously mottled, and there is no white nuchal band.

One of the most abundant species in dead corals is *L. longisetis* (W.) This becomes more than a foot long. In life it is reddish brown or chocolate-brown, curiously marked dorsally with longitudinal, zigzag or reticulated brownish-black lines. The antennæ and long dorsal cirri are conspicuously banded with pale yellow and dark brown, about 6 pale bands on the antennæ and 3 on the dorsal cirri. There is a conspicuous white band on the 3d setigerous segment. The larger branchiæ are pectinate, with 7 to 10 slender graduated cirri ; the first appear on the 4th to 6th segment, usually on the 5th. The head is bilobed in all our numerous specimens, though Webster described it as 4-lobed. His single specimen was probably badly preserved and misleading. It resembles *L. Floridana* (Ehl.) and *L. fucata* (Ehl.), of Florida.

Leodice mutilata (Webs.) = *E. barvicensis* McInt. is another large and abundant species, which lives with the last and is often over a foot long. Like the latter, it has a white nuchal band,—a feature not uncommon in the genus. These two species look much alike, but differ in their jaws and setæ. In *L. mutilata* the gills usually first appear on the 5th to 7th segment, and the largest seldom have more than 6 to 8 cirri, which are long and subequal. The dorsal cirri are much shorter than the branchial cirri, and the antennæ are rather short and not articulated.

Leodice denticulata (Webs.) = *E. cirrobranchiata* McInt. is another large species found among dead corals. Probably *E. filamentosa*

Œrs. and Gr. is the young (14½ lines long) of the same species. *L. conglomerans* (Ehlers) is a fully adult, large form, perhaps the same. Perhaps *L. hamata* (Schmarda) is also the same species.

It is distinguished by having the first simple branchiæ arising on the 23d to 27th segment, and bifid and trifid ones back of about the 45th to 50th segment; the largest branchiæ have usually 4 or 5 cirri, rarely 6; simple branchiæ extend to very near the end of the body. The antennæ are nearly smooth or feebly articulated, according to the state of preservation, and the enlarged distal part of the stem of the compound setæ is denticulated on one side. The segments are very short and numerous (over 300 in examples 250^{mm} long), and usually finely specked with white on the back.

Leodice binominata (Quatr.) = **E. punctata** Œrs. and Gr.

This is a smaller (150^{mm} long) and much rarer species, not before recorded from Bermuda. Its antennæ and cirri are long and delicately beaded, and it has branchiæ only on about 30 segments, beginning on the 4th or 5th. The larger ones are gracefully pectinate with about 10–12 cirri and they meet over the back. In life it is usually pale green, but reddish anteriorly, and finely specked with white dorsally, and with a median row of white spots, one to a segment; the cirriferous buccal ring is also white. The row of white spots persists a long time in formalin. *L. rubra* (Œ. & G.) is much like this, but has branchiæ on nearly all the segments.

Leodice elegans, sp. nov.

Head deeply bilobed, narrow. Body slender, with about 155 segments, flattened posteriorly. Notable for the anterior position of the branched gills.

Antennæ long and very slender, scarcely tapered, well articulated; about 10 distal annuli, most distinct on the longer ones, and mostly elliptical; the inner paired antennæ reach back to the 3d body segment; outer ones about equal to the long buccal segment (median is broken in the type). Eyes large, black, with a lens. Tentacular cirri slender, tapered, rather longer than the buccal segment, with about 8 short annuli. Parapodia prominent; dorsal cirrus rather long, tapered, acuminate distally, and annulated, with about three divisions.

Branchiæ are mostly gracefully pectinate; they begin with 2 slender branches on the 2d setigerous segment; they have 3 branches on the 3d, and become pectinate, with 4 or 5 branches, on the 4th; a little farther back they become 9-branched, with the branches slen-

der and graduated. On the posterior branchial segments there are three pairs of gills with 4 branches; 3 with 3; 2 with 2; and 1 with 1 cirrus. They end at about the end of the anterior third of the body, or near the 30th segment, leaving about 125 segments without any. Ventral cirrus anteriorly is long and tapered; on the 1st segment about equal to the dorsal cirrus. Upper caudal cirri long and slender, about like the tentacular cirri; lower ones short.

Capillary setæ are long and slender with fine long tips; brush-shaped setæ are few, with elongated marginal processes and about 6 intermediate fine denticles and striæ. Acicula 2, yellow, spiniform, hardly acute, unequal, about twice as thick as the compound setæ; the latter are short, their blades have ratios of breadth to length of 1:4–1:6, limbate, tip only slightly incurved, with a tooth below it, standing nearly at a right angle; another small tooth stands near the base; the edge of the limbus is finely serrulate, as is the inner distal margin of the head of the shaft.

Length, about 100^{mm} (mutilated posteriorly); breadth, 2^{mm} to 2.5^{mm}.

Only one specimen was found.

Leodice stigmatura, sp. nov.

A long, slender species with long, very slender, partially or distally annulated antennæ and tentacular cirri; long slender dorsal cirri; digitate branchiæ, the larger with three to five slender cirri, and bifid or simple branchial cirri present to about the 100th segment. Caudal region with two or four rows of distinct, round blackish spots.

Head with two lobes, separated but little by the frontal notch; each lobe is usually very obscurely divided by a slight transverse indentation into an upper and lower half (head quasi-4-lobed). Eyes rather large, black; median antenna very long and slender, scarcely tapered; the basal half obscurely divided by shallow grooves into rather short joints, but the distal part has more evident and longer articulations, the distal six joints forming about half its length; it extends back in some specimens to the 15th setigerous segment, but more often about to the 5th, varying according to the degree of contraction of the segments; it is about five times as long as the head; inner paired antennæ similar, but somewhat shorter, reaching in some cases the 10th segment, in others to the 3d. Outer antennæ about one-quarter as long as the median, more distinctly annulated, with about 10 annuli, the distal four forming half the

length, long-elliptical, or sausage-shaped. Tentacular cirri long, slender, tapered, acute, feebly articulated, about equal to the buccal segment and head, and decidedly longer than the outer antennæ. Parapodia rather prominent and the segments rather deeply constricted. Dorsal cirri long and slender, tapered; the anterior ones usually longer than the longest branchial cirri, and about equal to the length of four body-segments.

Branchiæ begin as simple cirri on the third segment; become trifid at about the 7th; 4-branched from about the 10th–14th to the 37th, and then decrease gradually, bifid and simple ones extending nearly to the end, usually ceasing about on segments 100 to 105, leaving about 40 bare, in specimens of average size. In the large examples some of the larger branchiæ may have five cirri; their cirri are long and slender, mostly subequal, arising from short stems, so that the gill is digitate rather than pectinate; the larger ones meet across the back.

The posterior and middle parapodia contain usually one or two spiniform acicula and a rather smaller, oblique, recurved uncinate one, which has a slightly bidentate tip, with two small scarcely hooked terminal denticles, below which the inner edge bears a much larger, rather wide, triangular tooth, standing at about right angles to the shaft; the end is broadly limbate. The compound setæ have rather long and narrow bidentate blades, the terminal hook being narrow and but little incurved, the other a little removed and divergent, so that the interspace is concave; the edge of the limbus and the terminal inner edge of the shaft are finely denticulate, as in *L. elegans*. The uncinate acicula frequently appear to have the tip narrowly truncate, owing, perhaps, to the wearing away of the two distal denticles, which are always smaller and less hooked than those of *L. binominata*.

The color in life is milk-white or translucent white, often with two submedian and two lateral rows of small, round, blackish spots; the lateral spots are at the bases of the gills and occur in several other species; the other spots are often conspicuous, but are sometimes wanting in the ripe females, which have the whole posterior part of the body filled with large white eggs. The intestine usually shows as a broad, irregular brownish band, and the dorsal blood-vessel as a narrow red line.

Length of ordinary specimens, in life, 75 to 100^{mm}; breadth, 1–2^{mm}; in formalin the length is usually about 60^{mm}. A few females, filled with eggs, are considerably larger,—about 100^{mm} long in formalin.

Not uncommon in dead corals on the reefs. A few specimens were found in tubes attached to the under side of stones at low tide. The tube is thin, parchment-like and coated with small fragments of shells. It secretes a large amount of mucus when disturbed.

Leodice concinna, sp. nov.

Head slightly bilobed, with a very shallow frontal notch. Eyes moderately large, black. Antennæ all strongly beaded, of moderate length. The median one reaches about to the second setigerous segment; outer lateral ones about one-third as long; inner laterals similar to the median one and nearly as long.

Buccal segment, with the cirriferous ring, is about equal to the next two segments. Tentacular cirri are about as long as the buccal segment, small, tapered.

Body-segments are numerous, short, but little constricted. Parapodia only little prominent, especially back of the branchial region. Dorsal cirri rather small, tapered, of moderate length.

Branchiæ are palmate or digitate, rather than pinnate; the first appear as small simple cirri on the third setigerous segment; 3-branched ones on the 7th; 4-branched ones on the 8th; none with five cirri were observed. They cease on the 52d segment, the last 10 being simple and short.

The setæ are much like those of *L. stigmatura.*

Found in dead corals from the reefs.

This resembles *L. stigmatura,* but the latter has many more branchiæ, longer antennæ and cirri, and more constricted and much longer segments.

Leodice tenuicirrata, sp. nov.

A small species with remarkably long dorsal cirri. Head very obscurely 4-lobed; the frontal lobes are rounded, but have a slight horizontal indentation on the outer side. The antennæ are long, slender and articulated; the median one is about four times as long as the breadth of the buccal segment; the inner lateral are lost from the type; the outer laterals are about half as long as the median, a little stouter and more tapered, and with many short annuli, in length equal to about $1\frac{1}{4}$ times the breadth of the buccal segment.

Tentacular cirri very slender, acute, nearly as long as the median antennæ. Dorsal cirri very long and slender, nearly as long as the tentacular cirri, are nearly equal to the breadth of the body, much longer than the branchial cirri; they stand out at right angles to the body so that they are conspicuous.

Branchiæ begin as simple cirri on the 3d setigerous segment; they have 2 cirri on the 6th; 3 on the 8th; 4 on a few segments farther back. On the 46th, which is the last segment preserved, they have two cirri. From dead corals; only one example.

The setæ resemble those of *L. binominata* and *L. stigmatura.* It is allied to *L. articulata* (Ehl.) and to *L. ornata* (Andrews).

Leodice unifrons, sp. nov.

A small slender species. Head undivided, rounded in front, without any frontal emargination, the outlines nearly semicircular. Eyes rather large, black. Antennæ articulated, with the annuli unequal, the distal ones elliptical, twice as long as wide, and very distinct; the median antenna is rather longer than the head and buccal segment; the inner laterals are a little shorter; the outer laterals about half as long as the median. Tentacular cirri are obscurely annulated, slender, about equal to the length of the buccal segment. The dorsal cirri are long, equal to the longest branchial cirri.

The branchiæ begin as simple cirri on the 3d setigerous segment; two branched ones appear at about the 8th segment; the largest are pectinate, with five or six long, slender, subequal cirri on the 16–23d; trifid on the 34th; simple branchiæ continue nearly or quite to the posterior end of the imperfect specimen, which has 43 segments.

In life the color is pale brown with a median dorsal row of white spots, one to a segment, and with olive-brown irregular mottlings on each side; antennæ pale, translucent, banded with flake-white.

The only specimen found had lost the posterior segments. It was about $1\frac{1}{2}^{mm}$ in diameter, in life, and $60–70^{mm}$ long.

Flatts Inlet, in shell-sand at low-tide.

Leodice margaritacea, sp. nov.

A small long and very slender species, nearly white, with a pearly iridescence. Antennæ slender, distinctly annulated; gills short pectinate; anterior parapodia prominent; posterior ones small. Head slightly bilobed; eyes rather large. Antennæ very slender, rather long; the median reaching back to the 2d or 3d setigerous segment; inner laterals a little shorter; outer laterals about $\frac{1}{2}$ as long as the inner. All are unusually slender, scarcely tapered, very distinctly annulated distally, the joints being constricted and the divisions longer than broad. Tentacular cirri slender, tapered, acute, reaching about to the front edge of the buccal segment. The 1st buccal segment and cirriferous ring together are about equal to the

next two segments and longer than the head. The parapodia on the anterior half of the body are rather long and prominent, with long capillary setæ, but back of the branchial region they become small and but little elevated, with a minute papilliform dorsal cirrus.

The larger branchiæ have 4 or 5 long slender cirri ; they begin on the 3d or 4th segment with two small cirri, and increase to 3 cirri on the 8th and to 4 at about the 14th ; those from the 24th to 28th often have 5 cirri. They begin to rapidly decrease at about the 30th and cease at about the 45th to 50th segment.

The capillary setæ anteriorly are 3 or 4, not very long, becoming 4 to 6 and longer, farther back ; compound setæ are about 6 anteriorly, and 4 posteriorly ; the uncinate setæ are strongly recurved at the neck ; the end is tridentate, the tip is divided into two small slightly incurved denticles, and the hook on the inside is sharply angular, longer than the terminal part.

The color in formalin is pearly white and iridescent, sometimes with slight darker bands or rows of spots across the anterior segments and with dusky annulations on the antennæ.

Length, 35 to 50^{mm} ; diameter, 1.5^{mm}.

Flatt's Inlet, low-tide to 10 feet, in shell sand, common.

Lysidice bilobata, sp. nov.

The head has two evenly rounded lobes in front, separated by a deep notch. The buccal segment is twice as long as the next, and about equal to the head. The three antennæ are about equal, and about as long as the head, scarcely tapered, blunt. The eyes are small, black.

The parapodia are small with papilliform dorsal and ventral cirri. On the anterior segments, the compound setæ are about 6, with stout distal enlargements and small, short blades, minutely bidentate at the extreme tip, and with a tooth on the inside edge, near the base. The capillary setæ are much longer, usually 4 or 5, considerably bent and flattened, with a long acuminate tip. The 2 or 3 brush-shaped setæ are rather small, and the rapidly enlarged end has about 10 slender denticles, the marginal ones only slightly longer. There is one, or sometimes two, black spiniform acicula and a black uncinate seta of about the same size, having the end slightly bifid and a little bent, but not limbate ; the bidentation is at the extreme tip ; the lateral tooth is slightly the larger and is directed obliquely distally.

Posteriorly the setæ are nearly the same, but the uncinate seta is more strongly bidentate.

Color in formalin, plain yellowish white and strongly iridescent. The largest specimen is a female filled with large white eggs. It has lost its posterior segments. The anterior portion, with 30 setigerous segments, is 9^{mm} long; 2^{mm} broad; young ones of 80 segments are 16^{mm} long.

Paramarphysa obtusa, sp. nov.

Long and slender, widest anteriorly, attenuated posteriorly, with rather prominent parapodia and long setæ in the anterior region, and much smaller ones posteriorly. Head $\frac{1}{3}$ broader than long, evenly obtusely rounded in front, with a faint median furrow, or slightly bilobed in front, according to the mode of preservation.

Antennæ smooth, rather short, the three median subequal, often fusiform and slightly tapered distally, or slightly clavate and obtuse; the median one is about twice the length of the head; inner laterals scarcely $\frac{1}{5}$ shorter; outer laterals $\frac{1}{4}$ shorter. Eyes large, black, reniform. Buccal segment rather longer than head, scarcely distinct from the next. Dorsal cirri rather short, tapered, the first very small.

The posterior third becomes very slender, with rather long and almost moniliform segments and small parapodia, with conspicuous black acicula. Caudal cirri small, about as long at the diameter of the anal segment; median cirrus minute papilliform.

The 1st buccal segment is nearly as long as the head, and $\frac{1}{3}$ longer than the second segment.

The 2d buccal segment is rather closely united with the first and with the succeeding 1st setigerous segment, with shallow constrictions, but farther back, the segments are convex with well-defined constrictions between them. The 1st pair of parapodia are small and only slightly prominent, with few and short setæ, and a small papilliform dorsal cirrus, smaller than the ventral, but they rapidly increase in size and prominence, in the thoracic region. Posteriorly they again become small, with papilliform cirri. The jaws are well developed but mostly pale horn-color.

Capillary setæ 4–6 anteriorly, 2–4 posteriorly, flattened distally, with long, slender pointed tips. Compound setæ 6–8 anteriorly rather large with short blades, minutely bidentate at the extreme tip, not incurved. Uncinate seta of the middle and posterior regions, large, black, strongly curved distally, at the neck, and with

a large angular hook, stouter than the acute terminal denticle; absent anteriorly. Aciculum posteriorly large, black, spiniform, subacute; paler and more slender anteriorly.

Color, in formalin, white. Length, 25–35^{mm}; diameter, 1–1.25^{mm}.

Flatt's Inlet, at low-tide, in shell-sand. Several specimens.

P. longula Ehl. differs from this in having a distinctly bilobed head; much longer antennæ, straighter and less hooked uncinate setæ, fewer and more slender capillary setæ, longer and more strongly bidentate blades to the compound setæ, and shorter jaws.

Nematonereis hebes, sp. nov.

Body long, slender, terete, with rather long, and posteriorly with only slightly constricted segments; often coiled in a spiral. Head broadly rounded in front, nearly hemispherical, rather broader than long. Eyes small, black. Antennæ fusiform, swollen above the constricted base and gradually tapered to the acute tip, nearly as long as the head. First buccal segment about as long as the head, the second about half as long and about equal to the next. The divisions between the two buccal rings and several following segments is very slight. Dorsal cirri on the 1st segment are small, papilliform; on succeeding segments they are longer and tapered, the longest about $\frac{1}{3}$ as long as the breadth of the body. The longest anterior parapodia are quite prominent, with a short, thick ventral cirrus, with a swollen base, a large setigerous lobe, and a long dorsal cirrus. There are 2 or 3 long, slender, slightly flattened capillary setæ; a few compound setæ with narrow, feebly bidentate blades; a slender, yellow, spiniform aciculum, and farther back an uncinate seta with a strongly recurved neck and a strongly bidentate tip; the hooked lateral tooth is larger than the acute terminal one, and angular, much as in *Paramarphysa obtusa.* Color, in formalin, pale greenish white.

Length, 25–30^{mm}, in formalin; diameter, about .3^{mm}. Three specimens.

Stauronereis, nom. nov.=*Anisoceras* and *Staurocephalus* Gr. (preoc.)

Type *Staurocephalus Rudolphii* (D. Ch.) Ehlers, Borstenw., p. 434, pl. xviii, figs. 17–26.

Anisoceras Grubé, Vid. Meddel., p. 60, 1856 (*non* Pictet, Cephal., 1854).

Staurocephalus Grubé, Zeitsch. fur Wiss. Zool., 1855, p. 97 (*non* Barr., Crust., 1846).

The name *Staurocephalus* must be dropped, because clearly preoccupied in Crustacea, 1846. *Anisoceras,* which Grubé originally considered a distinct genus, but which Ehlers and others have

regarded as only a subgenus, with longer antennæ, cannot be used for the genus, because it and its variants had been used in at least four or five other senses before it was applied to these annelids. *Anisoceras* was used by Pictet in 1854; *Anisocera* was used in Coleoptera, both in 1833 and 1835; *Anisocerus* was used in Coleoptera, both in 1835 and in 1837. *Prionognathus*, Kef., 1862 (*non* LaF., 1851, *nec* Pand., 1856) is a closely related group, but the type *S. ciliata* (Kef.) may, perhaps, be a distinct subgenus.

Another group, perhaps of generic value, is typified by *S. rubrovittata* (D. Ch.) well described and figured by Ehlers (Borstenw., p. 424, pl. xviii, figs. 1–16), which was the type of *Staurocephalus* Gr. It has a prominent, long, pyriform head with large, flat, recurved, frontal palpi; much shorter articulated antennæ; 4 eyes; a conspicuous ciliated lobe on each side of the neck; a terminal article on the dorsal cirri; stout nearly parallel lower jaws, ending abruptly anteriorly, and with acute, mostly strongly dentate plates in two or three series forming the upper jaws. For this group, I would propose the subgeneric name *Teleonereis*.

If it be thought necessary to change the name of the family owing to the change in the principal genus, I would propose to adopt *Stauronereidæ*, as it is analogous to *Lumbrinereidæ*.

The following three Bermuda species belong to the group called *Anisoceras* by Ehlers, for they have long articulated antennæ. The same is true of *Stauronereis pallidus* (V. 1873), of the New England coast; *S. sociabilis* (W. 1878) of Virginia; *S. cœcus* (W. 1884), of New England; and several European species, including *Stauronereis Rudolphii* (D. Ch.) so well described by Ehlers, and *S. Chiajei* (Clap.) of the Mediterranean; *S. rubra* (Gr.) St. Croix; *S. vittata* (Gr.) and *S. bioculata* (Gr.) from the west coast of Costa Rica.

S. (*Stauroceps*) *eruciformis* (Malmgren). This Arctic species may be the type of a special subgenus, *Stauroceps*. It has a small head with very short non-articulated antennæ and smooth dorsal cirri, without a terminal article. Its jaws, as figured, also appear to be more simple than those of most of the other described species. *S. minimus* (Langerh., 1884) of Madeira has even less developed antennæ and cirri, though it must be immature. Perhaps it belongs rather to *Paractius*.

Stauronereis melanops, sp. nov.

Head rounded in front and behind, with the sides a little prominent, about as long as broad; a pair of divergent, narrow-lanceolate ridges arises from the middle of the posterior margin.

Eyes round, black, with lens, the anterior ones much the larger, situated at the anterior bases of the antennæ and as broad as the antennæ, or a little broader; posterior eyes about half as large and nearer together, thus forming a trapeze. Antennæ longer than the palpi, tapered, distinctly annulated, with 13 articles. The articles near the base are short; distally they become much longer and more separated, the last two being 4 or 5 times broader than long, and these two joints project beyond the tips of the palpi. The palpi are stouter than the antennæ, curved, tapered, crenulated on the outer edge, and slightly annulated distally.

Dorsal cirri are biarticulate, rather long and slender, the basal article longer and about equal to the setigerous lobe on anterior part of body, while the distal article is more slender, tapered, acute. Posteriorly the basal article becomes longer and more slender, exceeding the setigerous lobes, and the distal joint also becomes longer, nearly as long as the basal, with a slender acute tip.

Setæ are long and numerous, the capillary ones are slender and straight, a little longer than the compound ones, which have a narrow blade, 5 to 8 times longer than wide, with strongly bidentate tips.

The lower jaws are strong, black, both ends strongly bent back like a short bow, the posterior end blunt; the anterior prolonged by a series of 4 small separate pieces; the upper jaws are elongated, little bent, divided into about 20 denticulated plates, with very acute, long, incurved denticles in the under series, anteriorly.

None of the specimens have the caudal segments; the longest is 10^{mm} long, 2^{mm} broad, and has 38 setigerous segments.

Stauronereis erythrops, sp. nov.

Head broadly rounded in front, a little produced posteriorly, longer than broad. Eyes yellowish-brown, arranged in a trapeze, and much smaller than in the preceding species, the anterior about twice as large as the posterior, all with a lens. The antennæ and palpi are short and about equal, in length less than breadth of head; the palpi are stouter than the antennæ; the latter are annulated. The dorsal cirri are much shorter than in the preceding species; the basal article is thick, the terminal is small, ovate or elliptical; the total length about the same as the setigerous lobe, or a little more, anteriorly, but posteriorly both articles become longer and the cirri considerably exceed the setigerous lobes. The compound setæ have rather short bidentate blades; their length 3 to 5 times their breadth.

The lower jaws are rather less bent than in the preceding species, with the posterior ends more incurved and acute. The upper jaws, which have about 16 plates in each series, are stronger and more bent in the middle, the anterior plates having the denticles shorter than those farther back and less claw-like than in the last species. The two middle denticles are much the larger.

The only specimen (probably young) has 55 setigerous segments; length, 7^{mm}; breadth, 1^{mm}.

These two species appear to be quite distinct from *S. pallida* Ver., 1873 (*non* Langerhans, 1879),* and other species of the United States coast, and from *S. rubra* (Œrst. and Grubé), as *Anisoceras* (1854) of St. Croix, the only related species described from the West Indian region.†

In both of our species the lower series of plates of the upper jaws terminate posteriorly in a rather short, irregularly oblong plate, without denticles, while the denticles increase in length on the other plates, anteriorly. Thus the structure is quite unlike that of the jaws in *S. rubrovittata* figured by Ehlers, but more like that of *S. Rudolphii.* The under jaws, especially, resemble those of the latter in form and in having a divergent series of small plates in line with the acute anterior ends, while those of *S. rubrovittata* are much stouter, straighter, and have obtuse anterior ends.

It is possible that these two Bermuda forms may be male and female of one species, but our specimens appear to be immature and the sex cannot be determined. Should this be the case, the name *melanops* would be preferred.

Stauronereis polydonta, sp. nov.

A third species has much longer upper jaws, with about 35–40 plates in each row, gradually decreasing to the minute anterior ones.

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* For the species named *S. pallidus* by Langerhans, 1879, I propose the name *Stauronereis Maderiæ*. It is very different from our New England species.

† The curious free-swimming, gregarious species recently admirably described and illustrated by A. G. Mayer (Bull. Mus. Comp. Zoöl., xxvi, No. 1, with 3 plates, 1900) as *Staurocephalus gregaricus*, does not really belong to that genus, but is the type of a new genus for which I propose the name *Mayeria.*

This genus is characterized by the presence of a single pair of unsegmented organs (palpi) on the front of the head, and by the unsegmented dorsal cirri. The type is without antennæ and eyes. The jaws, also, differ considerably from those of typical *Staurocephalus.*

Mayeria gregarica, the type species, was found swimming at the surface off the Tortugas, Fla., in vast numbers nearly at the last quarter of the moon, from July 1 to July 10, for breeding purposes. This species will almost certainly be found to occur off the Bermudas, at about the same date.

The compound setæ have very long, straight, minutely bidentate blades. Segments, 44 + ; length, 16^{mm}.

Lumbrinereis nasuta, sp. nov.

A long, brilliantly iridescent species. Head (cephalic lobe), in life, much elongated and subacute in extension, the length about twice the breadth, considerably flattened, changeable in shape, sometimes subacute ; no eyes. Buccal segment about half as long as the head. Parapodia small, setigerous lobe swollen ; cirrus small, blunt, papilliform. Setæ of middle and anterior segments are 3 or 4 long uncinate ones, with 2 spiniform acicula that do not project. The uncini bend back distally, at the narrowed neck, with an enlarged truncate head, terminated by two small strongly incurved apical hooks, and with a large, stout, blunt ventral hook. The neck and head have a curious miniature resemblance to those of a horse.

Color, in life, bright light red or purplish and highly iridescent ; parapodia paler or whitish. In formalin, purplish-brown. Posteriorly there is often a single, somewhat bent, acutely acuminate and limbate capillary seta.

Length, in life, 150 to 200^{mm} (about 6 to 8 inches) ; diameter 1 to 1.5^{mm}.

Flatts Inlet, in shell-sand at low-tide.

Arabella maculosa, sp. nov.

In life, very long and slender, only slightly iridescent. Head, in extension, long-conic, somewhat blunt ; ocelli 4, outer ones larger and slightly farther forward. Buccal segment elongated. Parapodia small, with a papilliform lobe.

Body, in life, pale orange-yellow. Most of the segments have 8 to 10 small, transverse, dark olive-green dorsal spots ; 2 of these are median, near the proximal and distal margins ; 2 others may occur on each side proximally ; a row of 4 smaller ones crosses the middle ; a pair of small white spots occurs near the distal edge. Parapodia pale. Posteriorly these markings disappear gradually. Length, in life, 150 to 200^{mm} ; diameter about 1^{mm}.

Flatts Inlet, low-tide, in shell-sand.

Aricia setosa, sp. nov.

Body widest and considerably flattened near the anterior end, gradually becoming smaller and narrowed posteriorly, with the under

side rounded and the back flat and nearly concealed by the prominent cirri and branchiæ. Anterior segments near the head rapidly decrease in breadth. Head small, flattened, widest near the front end, which is truncate or slightly emarginate; sides rounded. Two small blackish spots, like imperfect ocelli, are situated near its posterior border.

The branchiæ begin on the 6th setigerous segment, rapidly become of full size, when they are elongated, tapered, acute ligulæ, as long as the dorsal cirrus, but not quite so broad proximally. They continue nearly or quite to the end of the body.

The first two or three parapodia are quite small, but they rapidly increase to about the 10th. The lower division consists, on the anterior segments, of a torus filled with a crowded group of capillary setæ ; and a foliaceous lobe, prolonged above into a small papilliform cirrus. The tori increase rapidly to the 10th segment and continue of about full size to about the 20th and then rapidly decrease to the 25th, when they become very small, and beyond this, at about the 30th, they are replaced by a papilliform lobe and a cluster of longer capillary setæ and 4 or 5 larger spiniform ones.

The upper parapodium, anteriorly, consists of a broad flat lobe, prolonged at the dorsal angle into a small acuminate cirrus; at about the 25th–30th segment they change rapidly to a longer and narrower falcate cirrus, with a constricted base, above which they rapidly expand, on the outside, to a broad flat portion, beyond which they taper gradually to the subacute tip; they are concave on the dorsal side and are recurved over the back, like the branchial cirri, which they equal in length. These cirri, at about the 35th segment, are more than three times as long as broad, and about twice as long as the ovate ventral lobe, though not much wider.

The numerous crowded setæ of the anterior ventral toriform lobes are much alike, in the form of short, acute capillary setæ, with rather stout shafts. The capillary setæ of the upper fascicle are much longer and far more slender.

On a parapodium from the 32d segment there are 12–16 long, very slender capillary setæ, with attenuated tips, as long as the dorsal cirrus, and about 4 moderately large, straight, acute spiniform setæ, not half as long; in the lower fascicle there are about 18 shorter capillary setæ of the same kind, rather longer than the ventral lobe, and three slightly bent spiniform setæ.

On the posterior segments the setæ are similar, but fewer, about 10 to 12 long ones in the upper fascicle, and 6 to 8 in the lower, with

3 spiniform ones, a little more bent distally. The branchiæ are more slender and longer than the dorsal cirri.

In life pale red; each segment has two narrow, transverse, parallel, orange vittæ, not extending entirely across, and a roundish spot of the same color on each side at the bases of the dorsal cirri. There is a dark irregular spot close to front edge of the head.

Length, in life, 200^{mm}; breadth, 3 to 3.5^{mm}.

Flatts Inlet beach in shell-sand at low tide.

This species is evidently related to *A. platycephala* McInt. (Chall. Voy.), also from Bermuda, but the latter species has gills only on segments 8–18, and the setæ and cirri are different in form.

Cirratulus (Audouinia) capillaris, sp. nov.

A small species with very long slender cirri. Head short, somewhat depressed, bluntly rounded in front, confluent with the buccal segment; the next two segments are hardly distinguishable, except below, and thicker than those that follow, which are subequal, but increase in length posteriorly and decrease in diameter, some being as long as broad; the posterior ones become small, short and crowded.

Setæ and cirri begin together on the 2d body segment; the first cirrus is smaller than the others; the longest are on 2 to 6 following segments, but continue long on 8 or 9 more; shorter ones occur irregularly on more or less of the other segments of the anterior half of the body, but rarely on the posterior half; the length of these is scarcely greater than the diameter of the body.

A transverse group of longer and distinctly larger cirri or tentacles occurs on the 4th setigerous segment, arising from the dorsal surface, about 3 on each side.

The setæ of the anterior 6 or 7 segments, both dorsal and ventral, are very slender, capillary, acute, in small fascicles; they are about equal to $\frac{1}{2}$ the diameter of the body. Spiniform setæ, bent in a sigmoid curve, begin to replace the capillary ones in the ventral fascicles on the 8th segment, and increase in number farther back, till they nearly or quite replace the slender setæ. In the upper fascicles longer, more slender, nearly straight spines gradually replace the capillary setæ, but one or two of the latter persist nearly or quite to the end of the body. Posteriorly there are usually, in the upper fascicles, 2 or 3 spines and 1 or 2 capillary setæ; in the lower ones, about 3 curved spines, larger than the anterior ones.

Cirratulus (Audouinia) Websteri V., nom. nov.

Cirratulus tenuis Webst., Bull. U. S. Nat. Mus., No. 25, p. 323, pl. xi, figs. 56, 57, 1884 (*non* Verrill, Rep. Inv. Vin. Sd., 1873).

This Bermuda species is quite distinct from *A. capillaris*, which seems to be more nearly allied to *A. punctata* (Œrst. & Gr.), from St. Croix. The latter is said to have an interrupted row of cirri on the 5th segment, and differs in other ways.

C. assimilis McInt., which we also obtained at Bermuda, has two oblique series of eyes and larger branchial cirri.

Euclymene V., nom. nov. Type, *Clymene Œrstedii* Clap.

Clymene Savig., 1817 (*non* Oken, Moll., 1815).

The name *Clymene* having been preoccupied by Oken, I propose to substitute *Euclymene* for it.

As here understood, it would include as a subgenus, *Praxillella* Ver., 1882, type *P. gracilis* (Sars) = *Praxilla, pars*, Mgn., 1865 (*non* Reich., 1853). But if the latter cannot well be distinguished as a subgeneric group, then *Praxillella* should include the entire genus as being the earliest tenable name. The extended genus is characterized by the limbate head; funnel-shaped anal segment, bordered by numerous papillæ ; and especially by having on about three anterior setigerous segments, one or two stout, bent spines, replacing the rostrate uncini of the ventral parapodia. The setæ are mostly bilimbate, but there are generally, if not always, some smaller pennate setæ, especially in the first three fascicles. The uncini have three to five apical hooks in one row.

The typical forms seem to lack a distinct, free thoracic collar, but some aberrant deep-water forms, that have been referred here, have a collar. They seem to represent new genera.*

**Clymenopsis* V. Type *C. cingulata* (Ehl.) Florida Annel., Blake Exp., p. 185, pl. xlviii. This is characterized by the presence of a large collar on the 4th segment, most prominent beneath. The head is gibbous, with a very narrow limbus, and confluent with the buccal and following three segments. Uncini and anterior spines are as in *Euclymene*. Setæ bilimbate. Anal segment unknown.

Clymenura V. Type *C. cirrata* (Ehl.) op. cit., p. 182, pl. xlvi, figs. 10-13. Head as in *Euclymene*. Anal segment elongated, with a circular rim, bearing 4 long cirri. Uncini remarkable for having, above the large tooth, two transverse rows of numerous small hooklets, the first row containing about 9 larger ones, the 2d many more. The 2d, 3d and 4th setigerous segments are elongated, and each has a narrow anterior collar.

The number of setigerous segments is variable (18 to 70), but is usually from 18 to 22.

Subgenus *Euclymene* (typical) has 17 to 24 setigerous segments, of which the three anterior have one to three ventral spines, and one, two, or three preanal segments, without setæ.

E. zonalis V.=*Praxilla zonalis* V., 1874, is the only New England species.

Subgenus *Praxillella* has the same variation in the number of setigerous segments, but has 4 or 5 achætous preanal segments. *E.* (*Praxillella*) *gracilis* occurs off the northern coast of New England.

Among European species of *Euclymene*, besides the type, *E. Œrstedii* (Clap.); *E. palermitana* (Gr.); *E. planiceps* (Sars), 1871; *E. digitata* (Grubé), belong to this group. But *E.* (*Praxillella*) *lumbricoides* (Grubé); *E.* (*Praxillella*) *simplex* (Clap.); *E.* (*Praxillella*) *collaris* (Clap.); *E.* (*P.*) *gracilis* (Sars); *E.* (*P.*) *quadrilobata*, have the characters of the subgenus *Praxillella*.

A very aberrant species from near Vineyard Sound, Mass. (*E. elongata* (Lewis), as *Clymene*, Proc. Boston Soc. Nat. Hist., xxviii, p. 111, pl. 1, 2, 1897), has a remarkably large number of segments, about 70 according to the excellent description and figures given by Miss Lewis, to whom I am indebted for a specimen. In other respects it does not differ much from the more typical species. But the remarkable increase in the number of segments, so unusual in this family, seems to be a matter of sufficient importance on which to base a subgeneric group, which I propose to call *Macroclymene*, with *E.* (*M.*) *producta* (Lewis) as the type.

The principal characters of this group are the presence of a single preanal non-setigerous segment and of more than 50 setigerous segments, the increase being in the postabdominal region. As in the typical group, there are both bipennate and bilimbate setæ, and the rostrate uncini are of the usual form.

Euclymene coronata, sp. nov.

A large, stout species, none of the examples entire. Head short, thick, with distinct transverse and oblique lateral grooves; median ridge narrow, prominent, with a short obtuse tip; marginal lateral lobes rather wide, erect, with a slight lateral notch, above which the dorsal margin is divided into 8 or 10 small obtuse lobes or denticles.

First three setigerous segments (as contracted) are short, subequal, with a single (sometimes 2), stout, acute, slightly bent, yellow ventral

setæ, and a small fascicle (12 to 15 on the 3d segment) of long, very acute dorsal setæ; the 4th and 5th segments are rather longer, with long series of strong, bent, yellow, bearded uncini (about 30 on the 4th segment); 6th to 8th segments longer; 9th much longer, usually constricted behind the tori; 10th to 15th and following segments are very long, narrowed anteriorly, and have prominent posterior tori. Anal segment funnel-shaped, the border surrounded by 30 or more subequal slender papillæ.

The capillary setæ are of three kinds. Usually there are 6 to 8 longer and larger, rather strong, smooth, very narrowly bilimbate ones, ending in long, slender, flat, flexuous, minutely denticulate tips, and 4–6 shorter and much more slender ones, with fine capillary tips, not limbate; with these there are a few very slender, bipennate setæ, slightly flattened and widened distally, and finely spinulose to the acute tips, the spinules projecting considerably.

The uncini of the middle region are stout and bent back strongly, with a large, sharp, somewhat incurved rostral hook, and 4 small, graduated, appressed apical hooks, of which the 4th is very minute; apex and sides are strongly striated distally. The beard is long and curved strongly backward, it arises from just under the rostrate hook and contains but few fibers. The bulb of the stem is well developed.

Color, in life, bright red, more or less distinctly banded with bluish at the posterior end of most of the segments; posterior half of many segments bright red; 4th with a definite bright red ring.

Length, in life, over 150^{mm}; diameter, 4–5^{mm}.

Found at Castle Island at low-tide, in shell-sand.

Clymenella Verrill, 1873. (Sens ext.)

Axiothea Malmgren, 1865, type *A. catenata;* (*non* Pasc., Coleop., 1864).
Clymenella Verrill, 1873. Rep. on Invert. of Vineyard Sound, etc., pp. 49, 314, pl. xiv, and Annual Rep. U. S. Com. Fish and Fisheries, 1874, pp. 343, 608, pl. xiv, figs. 71–73. Type, *C. torquata* (Leidy).

The genus *Clymenella* originally had for its special character, to distinguish it from *Axiothea*, the presence of an evident collar, with a wide, free anterior edge, arising from the 4th setigerous segment. In all other characters it agrees well with *Axiothea* Mgn., in which no such collar has been described. I have since examined authentic specimens of *Axiothea catentata*, the type of the genus *Axiothea*, sent from the Museum of Copenhagen, and found that it has a narrow collar or fold, both on the 4th and on the 3d setigerous seg-

ments, but much less developed than in *C. torquata*, when the latter has been equally contracted by alcohol. The collar is doubtless much narrower in life than in the latter, but it is of the same nature.

As *Axiothea* was in prior use in Coleoptera (Pasc., 1864) it must be abandoned for this genus, and *Clymenella* now seems to be its equivalent, both types being essentially alike in all generic characters.

This genus has the following characters: Number of segments variable. A limbate cephalic plate; a funnel-shaped anal plate bordered with papillæ; a thoracic collar on the 4th setigerous segment, and sometimes on the 3d and 5th; rows of ventral, rostrate, uncinate setæ, having a series of apical hooks and a beard, on all the anterior setigerous segments; both pennate and smooth bilimbate capillary setæ in the upper fascicles (pennate ones overlooked or perhaps accidentally absent in some described species); usually 2 or 3 preanal segments without setæ.

Besides the type, at least two other East American species are known:

C. elongata (Webst.) 1879, as *Praxilla*, from New Jersey and Connecticut. It has thirty-seven to thirty-nine segments (thirty-six setigerous in the larger ones). Mr. Moore, 1893, has also described, as a new species, *Clymenella elongata* from New Jersey, which is probably identical, though the coincidence in name was accidental.

C. mucosa (Andrews) as *Axiothea*, Proc. U. S. Nat. Mus., 1891, has twelve uncini on the 1st setigerous segment, and thirty farther back. The anal papillæ are of various lengths.

These three species all have small pennate setæ mixed with the bilimbate ones, but in *C. torquata* the pennate setæ are very small, slender and fragile, so that they are easily broken off and overlooked.

Axiothella, sub-gen., nom. nov. Type, *A. catenata* (Mgn.).

Axiothea Malmgren, 1865; St. Joseph and others (*non* Pasc., 1864).

The name *Axiothea*, as above shown, is untenable, but I propose to establish a subgenus, *Axiothella* for the typical species of *Axiothea*, making the smaller or rudimentary condition of the collar* the

*St. Joseph, op. cit., p. 131, objects to the use of the existence of a thoracic collar as a generic character, because it has been found to exist in species of other genera (*Rhodine*, etc.). But the same objection would apply to the limbate head, and to the infundibuliform anal plate, which exist in several genera. In fact it is probable that in those cases where it exists it will be found to be associated with other truly generic characters. (See p. 654.)

principal character of the group. As in typical *Clymenella*, there are pennate setæ in the better known species, and perhaps in all, for they may have been accidentally lost in some cases, or else overlooked, owing to their delicacy and fragility.

Such setæ are known to be present in the following European species: *Clymenella* (*Axiothella*) *constricta* (Clap.); *C.* (*A.*) *cirrifera* (Lang.); and *C.* (*A.*) *lyrocephala* (Schm.) from Cape of Good Hope.

The two northern species, *C.* (*A.*) *prætermissa* (Mg'n.) and *C.* (*A.*) *polaris* (Theel) are not known to have pennate setæ, but these may have been accidentally lost or overlooked.

Clymenella (Axiothella) Somersi, sp. nov.

A slender species, with eighteen setigerous segments, perhaps more in the adults. The post-abdominal segments are unusually long.

The head is rather long, with a prominent median lobe having a produced obtuse tip, with a group of orange-brown ocelli on each side below; marginal lobes thin, rather wide, erect, nearly entire, those of the two sides confluent dorsally, with only a shallow median notch.

Head and buccal segment shorter than the following two segments; 3d to 5th setigerous segments are shorter; 6th is about equal to the 2d; 7th to 9th are elongated; 10th to 15th are very long with the tori at the posterior end. The length of these in a small specimen is 30 to 38^{mm}; diameter 3 to 4^{mm}; the 16th to 18th decrease rapidly in length. Two short preanal segments lack setæ. There is a narrow collar on the 4th setigerous segment and also on the 5th.

Uncini begin on the 1st setigerous segment, on which three or four stand in a row, in specimens about 50^{mm} long; four or five in each row on the 2d; six to eight on the 4th; longer rows farther back.

The caudal segment is cup-shaped with incurved sides and enlarged or annulated base; its margin bears about twenty-four slender cirri, alternately longer and shorter, with a distinctly longer one on the median ventral edge.

The capillary setæ of the first three setigerous segments are small, slender, acute, and nearly all are distinctly pennate to the tips, with rather long denticles; on the 4th segment they are partly, and on the 5th mostly, replaced by larger and longer, narrowly limbate, smooth setæ that taper rapidly to acute tips.

The uncini of the anterior region have a large, sharp, rostrate hook, directed somewhat upward, and three (sometimes four) small appressed apical hooks.

Color, in life, is light red in the smaller specimens, and with no definite red bands. The large ones were yellowish brown.

The tubes are made of fine shell-sand, and stand upright in the sand at low-tide.

In life the smaller specimens were about 50^{mm} long and 0.5^{mm} in diameter, the larger ones about 150^{mm} long and $4–5^{mm}$ in diameter.

In consequence of the modern revisions of the Maldanidæ by St. Joseph and others, it will be necessary to establish additional generic groups. The common, large New England species described by me (1873) as *Maldane elongata* cannot be placed in any of the recognized genera, and I therefore propose to establish a new genus for it.

Maldanopsis, gen. nov. Type *M. elongata* V., 1873.

Head with a well formed limbate cephalic plate, as in *Maldane*. Caudal segment with a wide, prominent foliaceous spatulate lobe on the dorsal side, and on the ventral side a deep, funnel-like, anal opening, surrounded by a distinct semi-circular rim, without denticulations, so that the anal opening is inside the margin of the anal plate, and not outside, as in *Maldane*. This plate is, therefore, more like that of *Petaloproctus*.

The anterior setigerous segment has no uncini; the 2d and 3d have short rows of rostrate uncini. All preanal segments bear setæ.

Lumbriclymene filifera Ver.

The *Maldane filifera* V., 1879, Proc. U. S. Nat. Mus., p. 179, does not belong to *Petaloproctus*, as St. Joseph supposed, but rather to *Lumbriclymene* Sars, 1871, but it differs from the type, so that the generic characters should be altered somewhat. Its anal region consists of a somewhat flattened cone, turned up dorsally and nearly acute, but without a limbus. The small anus is close to the tip on the dorsal side of the segment, while the oblique postero-ventral side may be flat or concave. The head has a central carina with a pit each side of it, but no definite plate or limbus. The anterior ventral tori contain one or two spiniform setæ. The two short preanal segments have small tori, but no setæ.

Praxillura Ver., 1879. Type, *P. ornata* V., op. cit., p. 179.

This cannot be united to *Lumbriclymene*, as St. Joseph has done with doubt. It differs very much in having spines on about seven anterior segments and a mixture of spines and uncini on others; in having very numerous segments (about 40); and in having the anal segments small and simple, or not specialized in any way, with the anus terminal.

This is, perhaps, the most generalized or primitive type of Maldanidæ hitherto discovered. This is shown in the simple structure of the head and caudal segment; in the large number of only slightly differentiated segments; in the increased number of anterior segments with simple spines, and in the mingling of spines and rostrate uncini in intermediate segments.

Eupolymnia, nom. nov.

Polymnia Malmgren, Ann. Polychæta, p. 108, 1867 (*non* Muls., Verr., Birds, 1866). Von Marenz., 1884. St. Joseph, Ann. Sci. Nat., Ser. 7, xvii, p. 219, 1894.

The above name is proposed as a substitute for *Polymnia*, which was preoccupied in 1866.

At the same time I propose to somewhat extend its limits, in order to include a remarkable Bermuda species for which it seems necessary to establish a subgenus, *Polymniella*.

As now understood, this genus is characterized mainly by having the ordinary Terebelloid form of body and cirri, with about 17–22 anterior segments bearing smooth capillary setæ, which begin on the 4th body segment. The uncini, which are rather simple, begin on the 5th segment. They have only two rows of apical denticles, usually with 2 and 3 in the rows; a rather long base, with a tubercle at each end, and a lateral tubercle for the ligament; on some of the anterior segments they form a single row, but farther back they are in two rows that face each other. The branchiæ are arborescent, the anterior usually largest. Usually there are three pairs, arising from segments 2, 3, 4, but in *Polymniella* the last is on the 6th segment.

The very large Bermuda species, *P. magnifica* (Webst.), see p. 599, above, is a typical member of this genus. It has over 120 segments, of which 17 bear setæ, and three pairs of large arborescent gills, the first pair largest.

Polymniella, subgen. nov.

This is proposed for the following new species which agrees with *Polymnia*, except in the arrangement of the branchiæ and anterior

setæ. There are three pairs of arborescent branchiæ, but they are situated on segments 2, 3, 6; segments 4 and 5 are without any trace of branchiæ in both specimens, though it is possible that they may have been accidentally lost from those segments, and in that case there would have been five pairs; the last pair is larger than the others. The capillary setæ begin on the 2d segment (or first branchial) and continue on 22 segments.

Eupolymnia (Polymniella) aurantiaca, sp. nov.

Cirri long and slender. The first segment is medially emarginate and recedes dorsally, but it advances in a broad lobe laterally; the next segment also has a similar lateral lobe. Ventral side with 10 short, transversely oblong glandular shields, with a few narrower ones farther back. The branchial stems are usnally very short, as contracted; the branches are fine and numerous.

The uncini are much like those of typical *Polymnia.* The base is about twice as long as broad, wide and rounded anteriorly, but slightly convex, or even concave, on the basal edge. The rostrate hook is large, strongly incurved; the two apical hooks, as seen in profile, are unequal, small and closely appressed; in a top-view there is a central, rather small denticle, and five much smaller ones, standing nearly in one cross-row farther back. The capillary setæ are long, smooth, slender, scarcely limbate, mostly with delicate, thin, flat, flexuous tips.

Color, in life, orange red; the gills blood-red. Length of the largest specimen, which is mutilated beyond the 30th segment, in formalin, 50^{mm}. Castle Harbor, in dead corals. Only two specimens.

Streblosoma M. Sars, 1871.

Grymæa Malmgren, Ofver. Kong. Vet. Akad. Forh., 1865, p. 388 (*non* Fres., Protozoa, 1858).

Streblosoma M. Sars, Vidensk.-Selsk. Forh., 1871, p. 10. Type, *S. cochleatum* Sars.

The name *Grymæa* was preoccupied, and *Streblosoma* is, apparently, the only tenable name of this genus.

It is closely related to *Thelepus*, but has three pairs of clustered cirriform branchiæ, and the capillary setæ begin on the second segment (1st branchial). All, or nearly all, the segments bear setæ.

The only New England species is *S. spiralis* Ver., 1874, as *Grymæa.*

The following Bermuda species differs so much from the type that it seems to require separation as a subgenus.

Eugrymæa, sub. gen. nov.

Differs from typical *Streblosoma* in having 4 clusters of cirriform branchiæ on segments 2, 3, 4, 5, and sometimes a few cirri on the 6th segment. The capillary setæ begin on the 1st branchiferous segment, and continue on about 35 to 45 segments, or nearly to the end of the body.

Streblosoma (Eugrymæa) polybranchia, sp. nov.

Body rather slender. The two anterior segments have a lateral lobe on each side. Tentacular cirri long. Lower lip small, semicircular. The branchiæ consist of four crowded clusters of long, slender cirri on each side of the first four setigerous segments, with a few in one case on the fifth; the first ones are largest. The fascicles of setæ begin with the branchiæ; the first ones are well developed; the last observed, which are on the 45th segment, are very small. Anteriorly there are 8–10 or more long, slender ones, narrowly limbate, with very slender tips, and about the same number of shorter ones, more broadly limbate on one side, much bent distally, and with shorter tips. The fascicles become abruptly smaller beyond the 17th segment. No pennate setæ were observed.

The uncini begin on the 4th setigerous segment. They form simple curved rows of 40 or more on the anterior segments, and shorter rows of 10–14 posteriorly. They are minute, about as long as high, with an elongated base, narrowed anteriorly and ending in a small muscle-tubercle, convex on the middle of the base, but concave on the posterior margin, which inclines forward, so that the posterior end is prominent and rounded, with a small tubercle for the ligament; rostrate hook large and only a little incurved; seen in profile there are two or three small apical denticles or hooks; in a top-view there is the central rostral hook and two small hooks at its base, side by side, and one or three very minute ones in a row farther back, the middle being slightly larger and often the only one visible.

Color, in life, pale flesh-color; cirri whitish. Length, in life, about 40^{mm}. Castle Harbor, in dead corals.

Protothelepus, gen. nov.

Allied to *Euthelepus.* The first segment forms an erect, plain, narrow collar around the bases of the cirri. A single pair of long,

slender, cirriform branchiæ; they arise, close together, on the dorsal surface of the front of the 1st distinctly setigerous segment; a few small setæ occur on the branchial segment. Capillary dorsal setæ are borne by at least 17 segments (the posterior segments are wanting). Series of ventral uncini begin on about the 3d setigerous segment; all simple. The uncini are rounded basally and have no lateral tubercle; apical denticles few. A large semicircular lip projects strongly.

Protothelepus tenuis, sp. nov.

The two branchiæ are very long and slender, about 6 times as long as the diameter of the body, about equal to the cirri in diameter, and crenulated on the anterior side. Edge of buccal collar nearly even, or slightly crenulated; it has a few small, irregular pigment-spots that may be the remains of ocelli. The cirri are numerous, long and slender, strongly crenulated.

The dorsal fascicles contain 8–12 setæ, which are distinctly lanceolate, bilimbate, minutely denticulate, acuminate, with slender tips; those of the first fascicles are smaller, shorter, and less flattened; those on the branchial segment are almost rudimentary. A few small capillary limbate setæ occur on the 21st segment.

The uncini form short rows of 8–10 on the 3d setigerous segment. They increase gradually in number and form a simple row of 14–17 on segments 20–21; they are short, with a rounded incurved base and obtuse angles, and have two or three small apical hooks; the large rostral one is strongly incurved, nearly as long as the basal plate; the others are much smaller, being closely appressed to the primary one. In a top-view there are 3 series of small apical denticles, with 1, 2, and 3; or 1, 2, and 5; the last are very minute.

Length of the type (with only 21 segments remaining) about 15^{mm}.

Nicolea modesta, sp. nov.

A small, slender species with two pairs of small, slender, sparingly branched, stipate branchiæ; the second one smaller. The first segment forms a low collar, slightly scalloped dorsally, and with two rounded lobes on each side; it has a row of small ocelli.

There are 17 setigerous segments, and about 34, more posterior, which carry rows of uncini. The setæ begin on the 2d branchial segment; uncini begin on the 2d setigerous segment; they form long simple rows, turned forward, on the first six segments, but on several

following ones they are in two close, parallel rows, facing one another. They are minute, with a wide base, broad anteriorly; the rostrate hook is large, acute; the two apical hooks are very small. They resemble the uncini of *N. simplex* V. and of *N. venustula*, as figured by St. John, but the base is broader anteriorly than in the latter.

The setæ are slender, 3 or 4 longer and 2 to 4 smaller and shorter; all are slender, smooth, narrowly bilimbate, acute.

Length, in formalin, 15mm. Bailey Bay, low-tide.

Loimia Bermudensis, sp. nov.

A rather stout species with three pairs of large, subequal, truly arborescent branchiæ, which have a rather long stem and very numerous branchlets, taking a somewhat conical arrangement when expanded. The lower lip is large, broadly rounded, and projects freely. There is also a large lobe partly behind it on each side. The buccal segment forms a broad hood-like fold in front of the bases of the cirri. There are also two lateral lobes on each side, on the 1st and 2d segments, below the bases of the anterior branchiæ. The fascicles of setæ commence, of full size, on the 3d branchiate segment, and are present on 17 segments. The fascicles contain about 32, in two rows, decreasing gradually in length. The larger ones are scarcely limbate, and taper gradually to sharp points. They are smooth except at the tips, where they are, in most cases, finely denticulate. The smaller ones are much more distinctly pennate on one side along the distal portion. Rows of uncini begin on the 2d setigerous segment; the rows are long, with very numerous large uncini, which on certain segments stand back to back in two parallel rows, with a parabolic ventral prolongation. They are higher than long, with five large, sharp, incurved hooks, decreasing somewhat distally; the base is oblique and convex, with an angular posterior lobe for the attachment of the ligamental filament and with a slender proximal process for the muscle attachment.

Color, salmon or pale flesh-color, in life.

Diameter 5 to 6mm; length of the longest, in formalin, 45mm, mutilated posteriorly.

The tube consists of a thin tough lining, covered with loosely adherent coarse fragments of shells, etc. Two specimens were taken.

Bailey Bay, low-tide, under stones.

Polycirrus corallicola, sp. nov.

A small, slender species, swollen anteriorly, attenuated posteriorly, consisting of about 45 segments in the type (perhaps immature). Cirri very numerous, slender, often clavate.

Fascicles of capillary setæ are present on 23 segments; rows of uncini begin on the 7th setigerous segment and continue to the end of the body; setæ and uncini are both present on 17 segments; 16 posterior ones have uncini only, the last rows with very few (2 or 3) minute ones, but they have filiform posterior ligaments.

The setæ are of two kinds: 4–6 smooth, slender, narrowly limbate, acute ones, often bent distally; and 5–8 more slender, bipennate ones, with rather long, hair-like denticles and very acute tips. Farther back each kind becomes shorter, stouter and fewer.

The uncini are minute, in single rows, the longest rows with about 25; they are usually longer than high, with a long, narrow base, tapering to a narrow, subacute anterior end, which terminates in a small muscle-tubercle; the posterior end of the basal plate is prominent, with a distinct ligament-tubercle; the rostral hook is large, long, incurved, nearly as long as the base; there are two small appressed apical hooks, the second one very small. In a top-view there seems to be a row of three very minute, distal, apical denticles.

The color, in life, is red. Bailey Bay, 3–4 feet, in corals.

Length of the type, 10^{mm}; diameter, 1^{mm} in formalin.

Polycirrus pennulifera, sp. nov.

A small, slender species, composed of about 65 segments, elongated posteriorly and swollen anteriorly, with numerous slender, highly contractile cirri. The setæ are present on 20 segments. Uncini begin on the 21st in very small rows and continue on about 40, or close to the end. They are very minute, and none of the rows are very long (15 or 16); they are longer than high, with a long wedge-shaped base, acute anteriorly, with a small terminal muscle-tubercle; the posterior angle is rounded and prominent; the posterior upright edge is concave in the middle; the rostral hook long, very acute, scarcely incurved, considerably shorter than the base and nearly parallel with it; there are two small, apical, closely appressed hooks, the second very small.

The setæ are slender, with the blade flattened and rather strongly bilimbate, so that they have a linear-lanceolate form, acuminate at tip; the limbus is obliquely striated, and the edge is minutely pen-

nate, so that they somewhat resemble narrow feathers, hence the name. Their form is unusual in the genus, but is similar to that of *P. denticulatus* St. Joseph.

Color, in life, bright red. Length, about 35mm. In dead corals.

Polycirris luminosus, sp. nov.

A third species of *Polycirrus* has long, slender, simple setæ on at least 31 anterior segments, accompanied by long rows of minute uncini after the 7th segment.

The setæ are numerous in the 17 anterior fasicles, of two sizes, the larger about ⅓ as long as the breadth of the body, very slender, not limbate, flexuous, tapering to a long sharp point; the small ones are similar to the larger ones, and about as numerous. On segments 25–31 they are few and small. Uncini begin on the 8th setigerous segment and continue to very near the posterior end, being present on over 40 segments; they form long simple series anteriorly, but back of the 30th segment they are on pinnulæ, in smaller rows of 10–15, but with very distinct posterior capillary ligaments. The anterior ones are very minute, longer than high, with a shoe-shaped base, a little turned up and subacute anteriorly, and with a prominent heel and concave sole ; the upright part is concave above the heel; the large rostral hook is about half the length of the base, little incurved ; apical denticles 2 or 3, the more distal ones very minute. On the posterior segments the uncini become higher, with a shorter base, and with two minute apical hooks in a side-view.

Color in life, bright red. It is brilliantly phosphorescent with a bluish light. Bailey Bay, 30–40 feet, among dead corals.

The descriptions of the two following very interesting species have been prepared by Miss Katharine J. Bush:—

Sthenelais setosa Bush, sp. nov.

Although only the anterior portion of an example belonging to the genus *Sthenelais* was found, it seems so to differ from all the species previously described from the West Indian and southern Atlantic faunæ as to deserve description.

The 27 segments occupy a length of about 10mm, with a width, including the setæ, of 3mm.

The cephalic lobe is about twice as broad as long, but little rounded posteriorly and well rounded anteriorly, with a large, trilobed basal

portion of the median tentacle arising from the middle of its dorsal surface and reaching well forward. The central portion, to which the long, smooth, tapered, median tentacle was attached, is about three times as long as broad, vase-shaped, and attached to the cephalic lobe by a slender, short stem, with a narrower, shorter, leaflike lateral lobe (ctenidium) on each side. There are four eyes; the very large posterior pair are situated just at the base of this lobe and the very small anterior pair lie just underneath the posterior edge of the lateral lobes. There is a pair of conspicuous setigerous lobes, reaching forward from the anterior surface of the cephalic lobe, each of which bears a cirrus of moderate length, arising from its median dorsal surface, above which is a cluster of numerous very fine, hairlike setæ, corresponding in number and form to those of the dorsal bunch of the lobes of the parapodia. Arising from the ends of these lobes are setæ of various forms, similar to those of the ventral bunch of the feet. Arising from the sides of the head, and partly consolidated with the cephalic lobe, are a pair of long setigerous lobes similar in form to those on the following segments. The first one is without a cirrus, but at its base is a conspicuous fleshy lobe, to the upper surface of which is attached the first pair of scales, or elytra; underneath and reaching out from the side of this lobe is the short dorsal cirrus of the second pair, which has a large swollen basal portion and a short tapered end.

Each of the following segments is furnished with a similar, but larger, dorsal cirrus, to the upper surface of the swollen basal portion of which the elytra are attached (on segments 1, 2, 4, 6, 8, 10, 12, 14, 16, 18, etc.). Only a few of the anterior elytra are present. These, which have a somewhat rounded form, are white and very thin, with the posterior edge ornamented with a few short, unequal, somewhat tapered filaments, and on the upper surface having very minute, scattered spinules. A slender ventral cirrus is present on all the setigerous lobes, those on the front of the head being much longer than the others.

From the ventral surface of the head arise the tentacle and palpi (only those on one side of the head are perfect, but they were presumably arranged in pairs). Attached underneath the base of the lateral setigerous lobe is a moderately slender, smooth, tapered, lateral cirrus, reaching to about the end of the ventral setæ.

Underneath the frontal, setigerous lobe arises a very long (3^{mm}), stout, smooth, tapered palpus; attached to the side of this and somewhat underneath, is a moderately slender, smooth tapered tentacular cirrus, about as long as, and similar to, the lateral cirrus.

From near the center of the head and below these other organs, arises a peculiar shaped one, attached to the head by a long, slender stem, having a rounded swollen central portion, with a moderately long, rather blunt, articulated, curved terminal portion.

Setæ of the dorsal bunch of one form, very numerous, like fine tapered hairs of graduated lengths, very delicately microscopically spinulose. There are four distinct forms in the ventral bunch. There are 8 or 10 in the lowest series, of graduated lengths, having smooth, slender, tapered, 2–4-jointed terminal portions, with delicate bifid tips, affixed in broader, shorter basal portions; above, a series of 8–10 with short, broad, graduated terminal portions having conspicuously curved, bifid ends, affixed in much broader, very long basal portions; above these, 3 or 4 long, slender ones, with 3–4-jointed, smooth, terminal portions having delicately tapered ends, affixed in broader, conspicuously spinulose basal portions; above these, 3 or 4 shorter stiff ones, conspicuously spinulose and rather broad, with regular tapered, striated or delicately banded ends.

Other species from this region belonging to the Sigalionidæ (Sigalionina Kinberg, 1855–58) are *Sthenelais articulata* Kinberg, 1855–58; *Sigalion Edwardsi* Kinberg, 1855–58 (= *Thalanessa* Baird, 1865); ? *Sigalion pergamentaceum* Grubé, 1855; and *Sigalion Pourtalesii* Ehlers, 1887.

The *S. articulata* differs in having long, articulated palpi, a smaller tentacular lobe, and smaller eyes.

Chrysopetalum elegans Bush, sp. nov.

Two specimens of a very beautiful species belonging to the above genus were collected in 1–3 feet. The larger one has about 65 segments and measures 15^{mm} in length and 2^{mm} in greatest breadth, including the setæ, and about 1^{mm} in thickness.

The paleæ are of a beautiful light golden color and are arranged in two series of from 15–20 on each segment, spreading out like a bunch of palm leaves, and from about the ninth segment meeting over the center of the back, forming a conspicuous ridge along the dorsum of the body. They have the form of long, narrow leaves, with coarsely serrulate margins, curved upward, and long spinulose tips; the center having coarse, equally separated, longitudinal ribs, 5 or 6 in number, running the entire length; the entire surface is also cross-striated and covered with microscopic granules.

The dorsal and ventral rami are well-separated, making the body somewhat angular in outline. Each is supported by a single aciculum. The dorsal one the shorter, with a prominent, swollen, brown-

ish terminal portion, to which the rather stout, abruptly tapered cirrus is attached ; this reaches a little further than the paleæ and often shows a dark color-patch near its inner end; the surface of both is distinctly microscopically granular. At the base and in front of this swollen portion, the setæ, about 10 in number, arise; they are of one kind, being similar in form to the paleæ, but narrower and more regularly tapered, and often have a conspicuous triangular process attached near their bases for their entire width.

The ventral ramus is less rounded and broader, and bears numerous, fine, jointed setæ of one form, their terminal portions being rather long and narrow, but little tapered, finely serrulate along their inner edge, with curved bifid tips, the shafts conspicuously pointed and longitudinally ribbed. The ventral cirrus is of moderate length, abruptly tapered.

On the back of the head there are three pairs of subequal black spots, apparently ocelli; those of the first and third are well-separated; those of the second pair, which is midway between these, are close together, nearly touching each other. On the perfect example the paleæ do not meet in the center so that they are readily seen on the first eight segments.

Only two other related species have been described from these waters :—*Palmyra elongata* Grubé, 1856, and *Bhawania Goodei* Webster, 1884 ; the latter was also found by Professor Verrill at Bermuda.

GEPHYRÆA.

Four or five species of Gephyræa were obtained with large numbers of interesting annelids, by breaking up masses of dead, or partly dead, massive corals from the reefs. Several large and beautiful species of *Leodice*, *Marphysa*, *Nicidion*, and *Paramarphysa* were secured in this manner.

The commonest gephyræan in corals is *Physcosoma varians* (= *Phascolosoma varians* Kef.). It is 1.5 to 2 inches long, clavate posteriorly, and thickly covered dorsally with black or brownish black specks and transverse patches, especially on the anterior part, where the blackish color is usually crossed by pale bands of varying breadth ; ground-color pale salmon. Posterior region closely covered with large, conical, brown grains or papillæ, becoming longer near the tip. The grains are lower with rounded tops on the mid-dorsal region; smaller and fewer beneath ; near the base of the proboscis they become conical and crowded. The distal part of the proboscis is surrounded by about 20–30 close rows of minute, black, curved,

acute, hooks, arranged closely side by side in each row; these are followed by close circular rows of minute rounded granules, which increase in size proximally.

The integument is firm, but somewhat translucent, and contains about 30 principal muscular bands, with irregular smaller ones between them.

This species appears to be the same as *Sipunculus granulatus* Pourt., 1851, from Florida, but it is probably distinct from the European *Physcosoma granulatum* (Leuck.).

It is evidently very closely related to, and perhaps identical with, *P. Puntarenæ* (Œrst & Gr., 1858), described from St. Croix.

Phascolosoma cylindratum Kef.

The second species is about 40^{mm} long and $3–4^{mm}$ in diameter, translucent whitish, tapering posteriorly, and almost perfectly smooth, but with microscopic pale granules posteriorly and with rows of minute, obtuse hooks on the anterior part of the proboscis; tentacles small, papilliform. This was more abundant in shell-sand at low-tide and under stones. The original type was from Bermuda.

Aspidosiphon spinulosum, sp. nov.

A third species, belonging to *Aspidosiphon*, was found in dead corals. The body is about 20^{mm} long; the probosis 24^{mm}, as preserved, and slender. The posterior shield is round, convex, light brown, with many radii; the siphonal shield is round, dark brown, covered with angular chitinous grains. The body is granulated with minute chitinous points close to the posterior end; the proboscis is covered above with minute black, sharp, recurved spinules, becoming fewer and smaller beneath. The large retractor muscles are attached far back.

Golfingia elongata, sp. nov.

The fourth species is, perhaps, a *Golfingia*. Its body is slender, about 20^{mm} long, 2^{mm} in diameter; the extended probosis is $15–20^{mm}$ long and about 1^{mm} in diameter. Color, yellowish brown. The horny ring at the base of the proboscis is dark brown, wide, and gibbous dorsally, much narrower beneath, tapered anteriorly, covered with strong longitudinal and divergent ridges. The posterior shield is round, conical, with fine radial lines. The proboscis is rugulose, wrinkled, covered with minute, sharp, erect spinules, arranged without order. It is darker brown than the body, which is white posteriorly and smooth for about $\frac{1}{3}$ of its length.

ERRATA.

Page 554, line 5, for 1876 read 1872 ; line 25, for 1887 read 1889.

Page 584, line 16, for 40 read 41 ; for all read nearly all.

Page 584, line 23, for *Ophidiaster* read *Linckia*.

Page 615, line 4, for P read H.

Page 616, line 18, for Typanosyllis read Trypanosyllis.

Page 666, line 6, for Polycirris read Polycirrus.

EXPLANATION OF PLATE.

Plate LXX.

Figure 1.—*Lineus albocinctus*, sp. nov. Dorsal view. × 1½.
Figure 1*a*.—The same. Side view of head. Enlarged.
Figure 1*b*.—The same. Dorsal view of head. Enlarged.
Figure 2.—*Lineus albonasus*, sp. nov. Dorsal view. Natural size.
Figure 3.—*Tœniosoma curtum* (Hubr.). Dorsal view. ½.
Figure 4.—*Barentsia timida*, sp. nov. × 10. From a photograph.
Figure 5.—*Pseudoceros superbus* Lang. Dorsal view. Natural size.
Figure 6.—*Pseudoceros pardalis*, sp. nov. Dorsal view. ⅔.
Figure 6*a*.—The same. Posterior part. Ventral view; *a*, mouth; *b*, male genital pores; *c*, female genital pore; *d*, sucker. Enlarged.
Figure 7.—*Cistella cistellula*. Dorsal and ventral sides. × 10.
Figure 8.—*Diazona picta*, sp. nov. One small lobule. About natural size.
Figure 9.—*Ammothea* (*Ammothella*) *rugulosa*, sp. nov. Much enlarged; from a photograph.
Figure 10.—*Achelia* (*?*) *gracilis*, sp. nov. Much enlarged; from a photograph.

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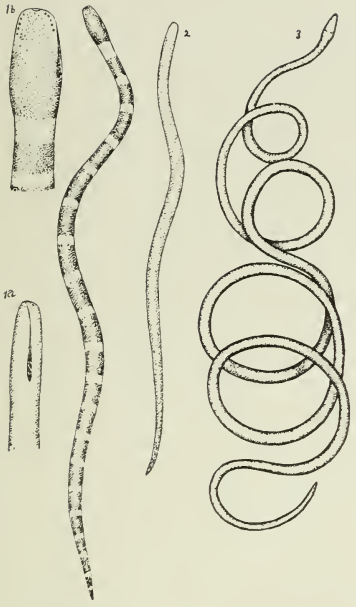

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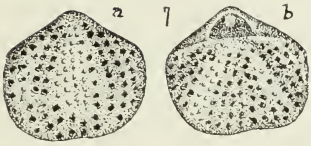

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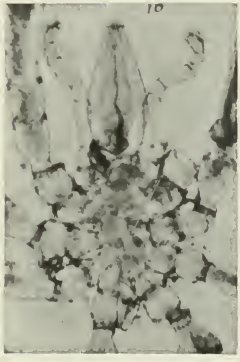

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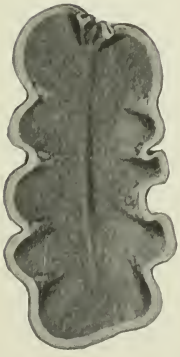

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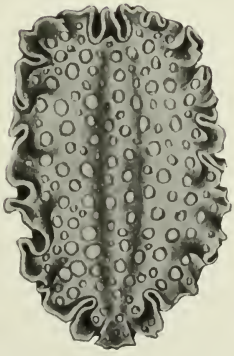

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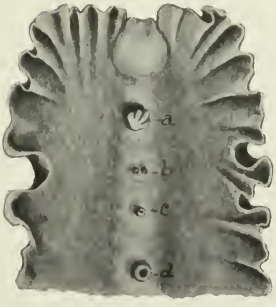

A. Hyatt Verrill from nature.

BERMUDA MARINE INVERTEBRATES.